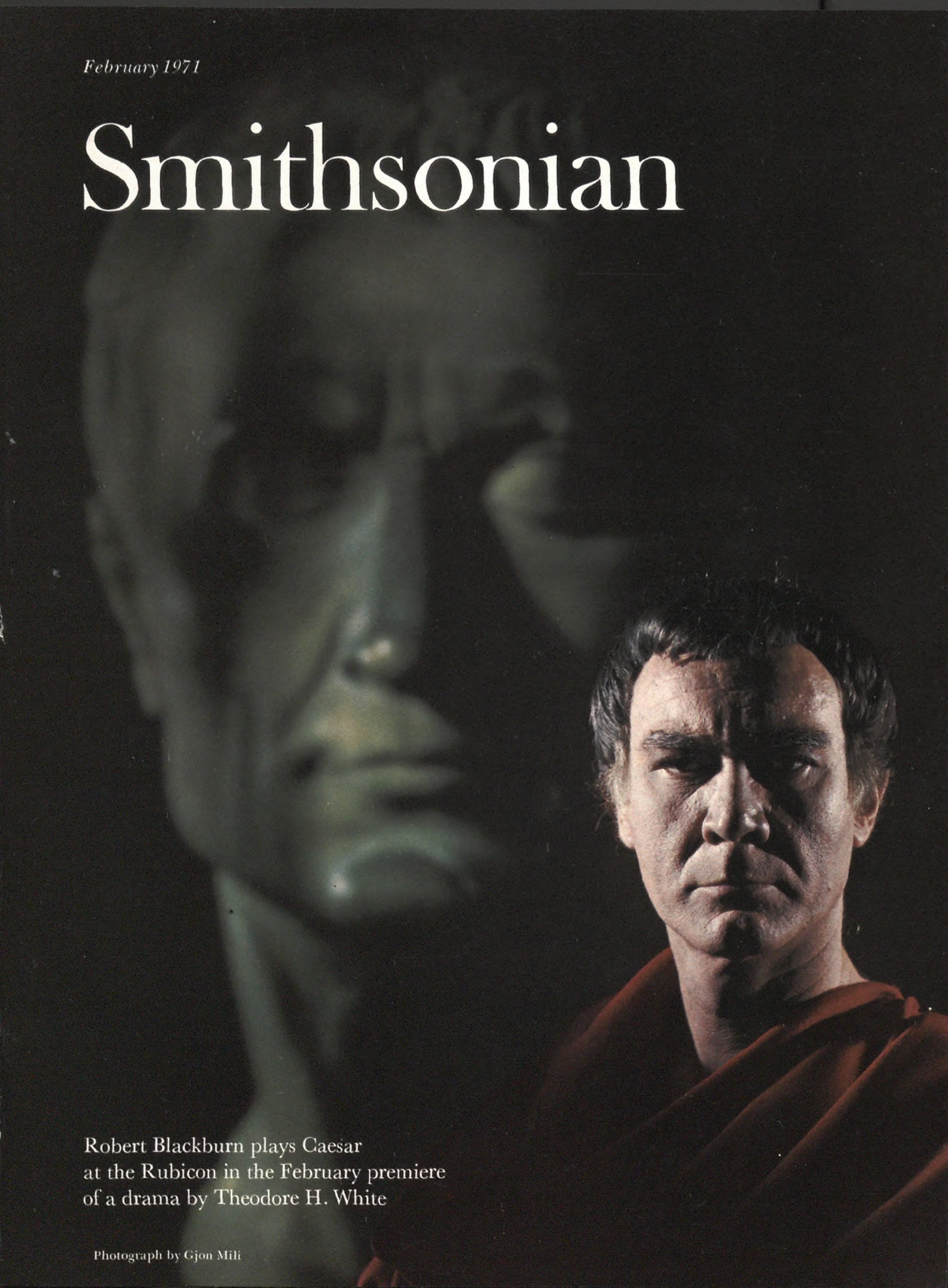
February 1971

Smithsonian



Robert Blackburn plays Caesar
at the Rubicon in the February premiere
of a drama by Theodore H. White

Photograph by Gjon Mili

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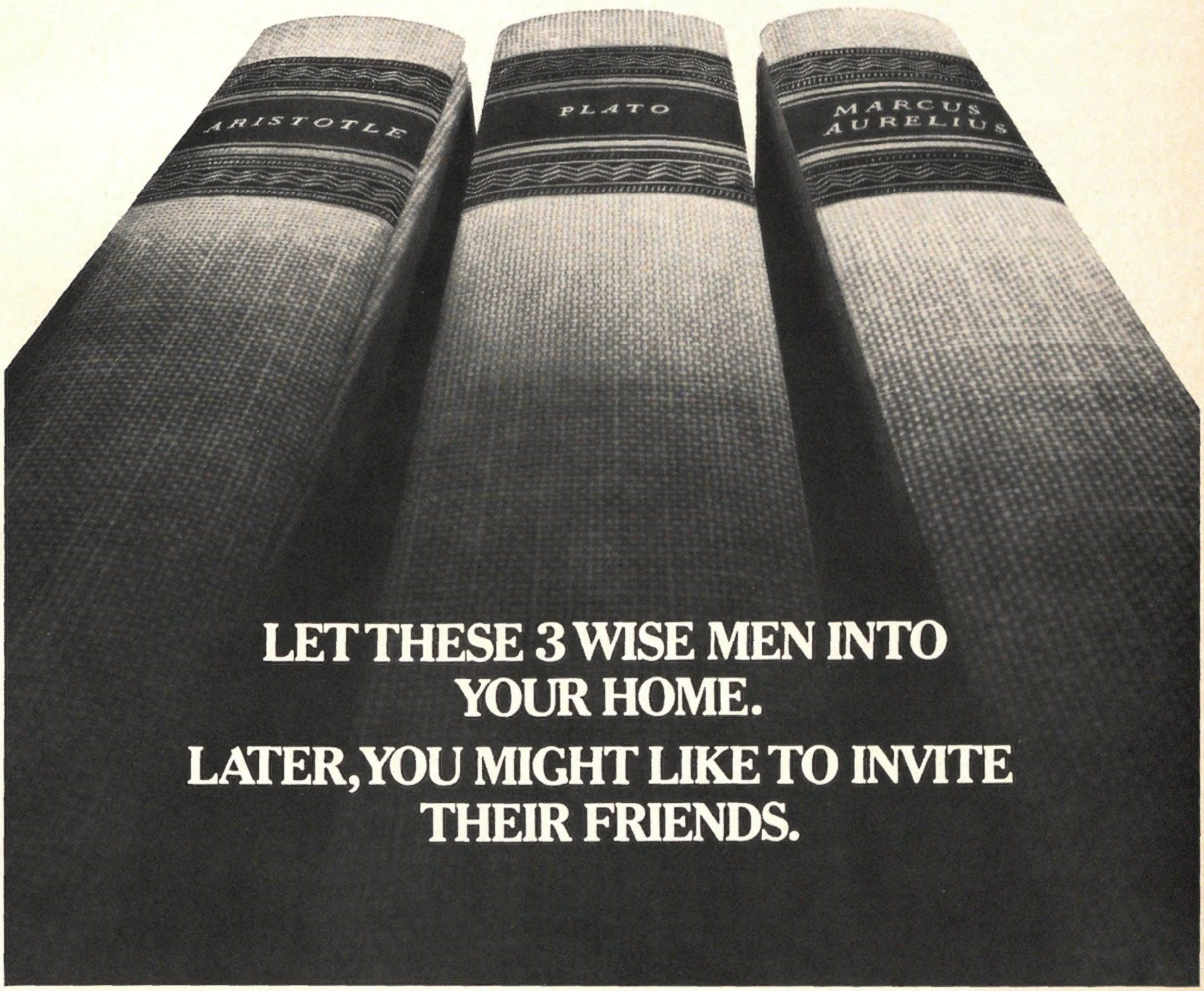

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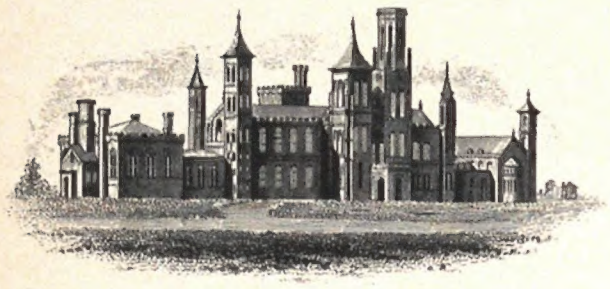
The view from the castle



Take two freight cars of specimens,
add time and energy—eventually
you'll get a natural history museum

One of the principal ornaments of the Smithsonian is its Natural History Museum, whose father was the second Secretary, Spencer F. Baird. A zealous collector and field man in his youth, Baird came to work for the Institution in 1850 as Assistant Secretary in Charge of Publications, Exchanges and Natural History. He brought with him from Carlisle, Pennsylvania (where he was professor of natural history at Dickinson College), his wife and daughter Lucy, two freight cars filled with thousands of bird skins, birds' eggs and nests, and mammal specimens, more than 500 jars of reptiles, amphibians and fish specimens, embryos of many animals, 600 specimens in skull or skeletal form and a large collection of fossil bones.

Armed with such impedimenta, he set about with meticulous zeal and pack-rat enthusiasm the creation of what has now become one of the largest museums of its kind in the world. Under its Charter the Smithsonian was the legal repository for the collections from the many exploring expeditions of the 19th century, and it is easy to imagine the enthusiasm with which Baird set about amassing all this material.

During his long career, including his election as secretary on the death of Joseph Henry in 1878, Baird achieved an extraordinary amount. He created the U.S. Commission of Fish and Fisheries in 1871 and was appointed its first commissioner. In the same year, he opened a research station on Cape Cod that later became the Woods Hole Oceanographic Institution. In 1878, he opened the second building of the Smithsonian, the National Museum, filling it with collections of all kinds including the Centennial collections donated to the U.S. government after the Philadelphia celebration of 1876. Finally, in 1879, he organized the Bureau of Ethnology of the Institution which was headed for 23 years by the famous explorer and geologist, Major John Wesley Powell.

A superb cataloger and a meticulous collector, Baird became what would be called today, a "science administrator." Nonetheless, he found time to write over 300 scientific papers, administer the Commission of Fish and Fisheries (and in the process become the world's recognized authority on pisciculture), and play father confessor to dozens of young scientists who lived and worked in the towers of the old building.

What is now called the National Museum of Natural History and the National Museum of Man opened in 1911, the culmination of Baird's work and a posthumous tribute to his industry and acquisitiveness. One of Baird's most pungent descriptions of this characteristic of his is in a letter of 1857 to Joseph Leidy of Philadelphia. Describing a young friend, Baird said, "He is the most notorious snake, salamander, bug, cavebone, wolf, panther and tadpole-catcher in the community, your humble servant perhaps excepted!"

With its great collections as a springboard, the Museum of Natural History has launched itself into the 1970s with a comprehensive look at the environment. Its collection of meteorites is revealing new truths about space and stellar history. And, with new study techniques, the Museum is pioneering in areas of oceanography that would warm the cockles of Baird's heart.

S. Dillon Ripley

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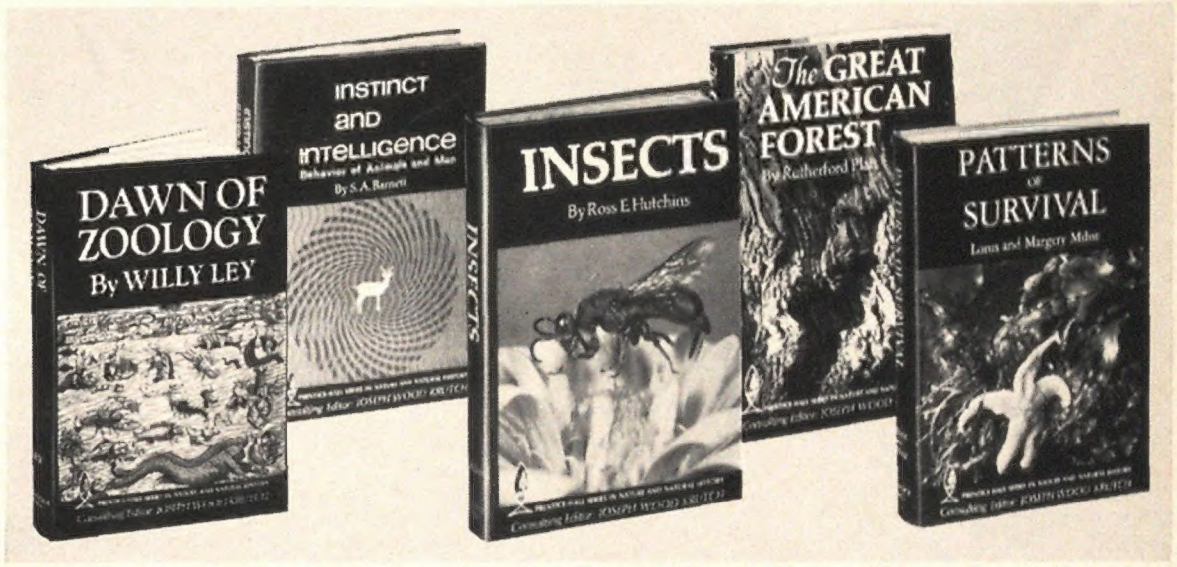

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Letters to the Editor

Aquileia acronym

Dear Sir: Please explain the acronym ιχθυς (ichthys) referred to in the article on Aquileia in your December issue. How do you relate those letters to the English "Jesus Christ, Son of God, Savior"?
T. Cerwonka
Kingston, New York
They are the initial letters of the phrase as originally written in Greek (here transliterated into the Latin alphabet): Iesous Christos theou hyios soter. Ed.

It's mostly raining cats

Dear Sir: To end the fine December issue with an anti-cat article is depressing, although I'm also a dog lover.
Phoebe Perkins
Ashton, Pennsylvania
On the inside back cover of SMITHSONIAN*'s November 1970 issue, there is a small bulge in Patrick Ryan's left cheek. That is his tongue, as Miss Hays knows and Mr. Nagelschmidt suspects (see letters following).* Ed.

Dear Sir: It was a delight to read Mr. Ryan's discourse. The truisms and humor kept me smiling for hours. May I add that there is no pretense about the cat and that beguiling live-above-it-all grin gives it an edge on the human species, hence the ad infinitum appeal of felines (which Mr. Ryan furthered).
Violet Hays
Monroe, Connecticut

Dear Sir: Patrick Ryan's smart-alecky article about cats may have been written tongue-in-cheek. Anyone who is knowledgeable about cats—they have been warming my "platform" for 20 years—knows that cats enjoy creature comforts, as humans do. What's wrong with that?

A cat is an extremely decorative and clean animal, a "philosophical" creature that wisely has been more willing to come to man's terms than Mr. Ryan thinks. But cats are not toadies or fools. And they do not commit suicide, start wars or travel in packs against defenseless enemies.

No cat can survive long on the scant nutritional diet of rodents. A rat is a cat's bread and water, that is all. Colombians are mistaken if they think that *Felis catus* is going miraculously to offset their deficit of hygiene. Big, wild rats have been known to destroy cats, especially ill-nourished ones.

America, or any other cat-loving nation, cannot spare a single cat from its maligned numbers for the Colombian adventure. We need them all at home.
J. S. Nagelschmidt
Washington, D.C.

Lake Erie picture

Dear Sir: I read with interest your December 1970 article, "Lake Erie is Aging . . . ," but want to point out that the picture supposedly showing Cleveland is really Lackawanna, New York.
Robert C. McDowell
Cleveland, Ohio
Mr. McDowell is correct. Ed.

Dear Sir: There is no steel plant in Cleveland on Lake Erie. Cleveland's plants are located several miles up the Cuyahoga River which empties into Lake Erie. One of the companies, Republic Steel, has spent $24 million to eliminate red-oxide discharge. The other steel companies have water pollution control programs in various stages.

I'm also enclosing a reprint of an article from *Industry Week*. Dr. William T. Pecora, director of the U.S. Geological Survey, states, "I come right out of my chair whenever I hear once more on TV that Lake Erie is dead. Lake Erie, if anything, is too alive. . . . The fish harvest of Lake Erie [is] equal to the rest of the Great Lakes combined."
Robert H. Bridges
Cleveland, Ohio

Life near Lake Erie

Dear Sir: I would like to add my comments to those of Donald O. Waters (December Letters column) who complained that authors James W. Wright and Charles F. Wurster should have provided more data in their October articles on the DDT controversy.

Dr. Wurster stated in his article that bald eagles have DDT poisoning. In Ohio we believed that. But when we approached an eagle's nest to collect the DDT-addled eggs to send for analysis to prove the pesticide guilty, we saw an eaglet raise its head; nature betrayed our confident condemnation of DDT. Later we learned from the Ottawa Wildlife Refuge that 30 pairs of breeding eagles inhabit the southern shore of Lake Erie which is so often proclaimed "dead."
Paul D. Harwood, Ph.D.
Ashland, Ohio

Priorities on the ecology

Dear Sir: Philip M. Hauser, who says it is more important to eliminate Chicago slums than to clean up Lake Michigan, plays into the hands of those who prefer to do nothing about the very problems he cites. He flatly asserts that technology can be used to eliminate pollution. Technology can be used to alleviate pollution problems, but that's all.

It is sad to find someone with Dr. Hauser's credentials placing naive faith in the "green revolution." Tens of millions of people *will* starve to death in the 1970s. As Dr. Hauser himself admits, the best the green revolution might accomplish is to buy the world some time. In that time, we must halt population growth—*and* clean up Chicago's slums, restore Lake Michigan, and so on. These things are not alternatives.
Nicholas Rosa
Redwood City, California

Accorsi's circus

Dear Sir: I was enchanted with the words and pictures by William Accorsi in SMITHSONIAN, December. The author/artist's "Circus and Wild West Show" is one of the most delightful art works that I have seen.
Nelson H. Spencer
Dallas, Texas
(Continued on page 6)

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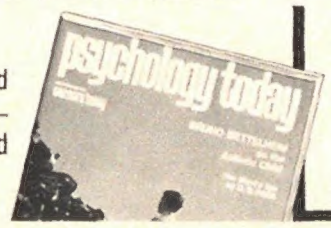

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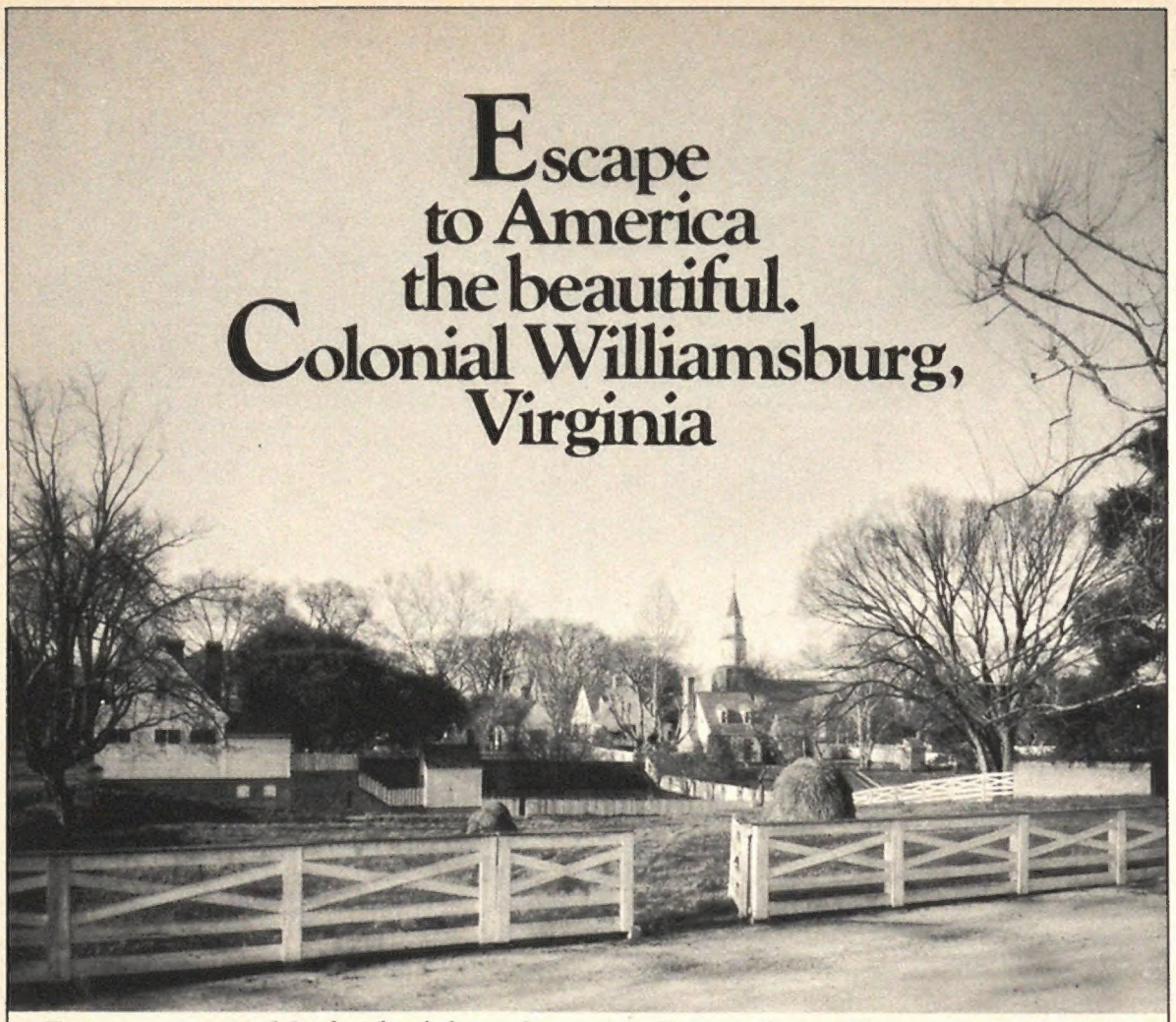

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(Continued from page 4)

Some anti-Ardrey notes

Dear Sir: I was horrified that SMITHSONIAN devoted a five-page article to Robert Ardrey simply because of his success in gaining widespread readership by a lay audience. Robert Ardrey is not a scientist and, furthermore, his conclusions are seriously questioned. It may be fine for you to present Ardrey's views but other sides should have a say.

Don Abare
San Diego, California

It was clear from the SMITHSONIAN *article that Ardrey is a controversial figure, but frequently knowledgeable and good science writers can be more illuminating than scientists themselves.* SMITHSONIAN *did not endorse Ardrey's views but the great behaviorist, Konrad Lorenz, has done so. In addition,* SMITHSONIAN *has presented other sides of the behavior and environmental story with articles by authors such as René Dubos (April 1970), John B. Calhoun (January 1971) and Dubos on Loren Eiseley.* Ed.

Dear Sir: Mr. Ardrey raises the valid point that each child is different and must be treated as an individual. Why then is it so difficult for him to understand that, biology aside, each woman is a different individual from her sister, as each man is from his brother?

We should get it into our brains that women and men should not have rights over each other; that women and men have like abilities, intelligence and creativity; that men as well as women are sensitive, emotional and have the same capacities for parenthood.

He's still writing more fiction than he seems to realize.

Mrs. Betty Weiss
Los Angeles, California

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By Theodore H. White

Caesar at the Rubicon: in six weeks of drama, mankind's course was changed

A man to make you wonder: Gaius Julius Caesar. Who he was, what he was, what manner of man he was—no one knows for sure. Every age has carved its own Caesar, dressing him with its own passions and fears, so we know of Caesar the tyrant and Caesar the merciful; of Caesar the killer and Caesar the lawmaker; of Caesar the wise and Caesar the lover; and of Caesar the deified. Beneath them all was a man. Here I have tried to explore not only what history says he did, but how he may have felt while doing it.

Any political reporter, I suppose, must be tempted to write about Caesar. I found him an irresistible subject and I chose an episode in his career, a moment of ripping violence that has gripped the imagination of all who have tried to recall him—the decision to cross the Rubicon.

Savage though Caesar's Rome may have been, men tormented themselves with the same problems of freedom, of law, of order, of discipline, of empire that torment the world today. Mobs rioted in Rome's streets. Distant wars did not stop Romans from indulging themselves in the pleasures of flesh, drink and revel. Murder was a political tactic, extermination a foreign policy. Three generations would pass before Christ spoke for mercy. Yet Julius Caesar seriously questioned the limits of force and first tentatively explored mercy as a policy of government. He even treated his captive, Vercingetorix, mighty leader of the Gauls, with respect and consideration.

In the year we now reckon as 50 B.C., Caesar has returned to Italy after a nine-year campaign beyond the Alps. His 50,000 legionaries have broken 15 million Gauls to Rome's will. Expecting triumphal welcome, he plans to run for the office of consul—and impose on Rome the unwelcome reforms he knows are necessary for the corrupt capital.

A man of politics, he understands the ways to sway

White's books and TV documentaries boast a list of awards. His three versions of The Making of the President *have gained him fame—and once a Pulitzer Prize.* Caesar at the Rubicon *is his first play.*

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It was a time of power politics, somewhat like our own.
The man, as some we have known, was a master of the game.
Author White brings time and man together in a new play
scheduled to open February 12 at Princeton's McCarter theater.

The play's single set depicts a timbered tower of Caesar's headquarters—austere except for glittering trophies on one wall. Parapet at rear overlooks the low marshland of Ravenna.

votes, to mobilize common people against the *factio paucorum,* Faction of the few—the Establishment of that day. Balding, past 50, he wears the scarlet cape of Imperator, supreme military commander. The cape clothes him in immunity from Roman law as long as he holds command beyond the Rubicon—the small stream that marks the boundary between the Roman Republic and its provinces. No commander may cross the Rubicon with legions without permission from the Senate or Assembly in the capital.

The politics of Rome are about to deny Caesar this permission. At his camp, 20 miles north of the Rubicon, Caesar and his loyal officers wait, trying to influence that decision. Balbus, the fat Spaniard, has been to Rome to wheedle support from Pompey, Caesar's old military rival and onetime partner. Hirtius, the ever-fussy secretary, has tried, and failed, to cajole the formidable Cato in the Senate. Pollio, the youthful historian who later built the first public library, has returned to camp after secretly warning the legions left behind in Gaul that they must be ready to march if ever the signal fires are lit—and so support their leader should he decide to march on Rome in defiance of the authorities.

In this adaptation of Act II, Scene II, we meet the members of the camp on the last day of the winter festival, the Saturnalia. Caesar is to attend a banquet prepared by his veteran legate, Labienus. Present also is Curio, just arrived from Rome where he has served as Caesar's chief political agent. Curio has just been replaced as tribune in Rome by Mark Antony, a vigorous young hothead, who remained loyal to Caesar throughout the latter's life.

Curio brings news of Rome's political climate vital to Caesar. Pollio, narrator of the play, begins this segment from the three acts of *Caesar at the Rubicon* by addressing the audience.

Richard Pilcher, a Brooklyn actor, studies the part of Pollio, the historian and narrator, minus his toga costume, shown in a rough sketch below.

Pollio: Thus, the last day of Saturnalia, and we were going to feast. But joylessly. No sign from high. Next week in Rome the incoming consuls would state their program to the Senate. Pushed about by Cato and the Faction, by Pompey and his troops, by the mobs and other men's ambitions, the consuls must set a course. All hating each other but fearing Caesar more. They in Rome—and we so far away at banquet.

Labienus: (He has just set a golden goblet down at the corner of the triclinium where Caesar will obviously sit) I tell you, the gods are angry with us. I don't like it. Nothing fits together. It does not fit.

Caesar: (Enters briskly as Labienus talks) What does not fit? (He sits at the head of the table) Sit! What does not fit?

Labienus: Nothing fits—the gods are angry, Pompey cold, the Senate torn, the mobs wild.

Caesar: Curio, you've been our man in Rome. How do you read the fit of things?

Curio: Everyone is waiting for the opening of the Senate. This is political shopping season, everyone looking for a bargain—in gossip, at meetings, at dinner parties, at Pompey's mansion, in Cato's villa . . .

Caesar: . . . Pompey, Cato, Senate. There has to be something that will satisfy either one or the other and split them apart. Hirtius, was there any crevice, even tiniest fingerhold when you talked to Cato?

Hirtius: I tried. But he wants you small, because he wants Rome small. Repeats himself like a priest chanting in temple. Caesar must submit to law, says Cato—must put down arms when law requires, give up command, return to Rome to face his fellow magistrates.

Labienus: (Peering about for his servants) I told them to serve as soon as Caesar sat. (As he strides to the door, he flings back his judgment) I say: Ignore Cato. Cato is one man only, no army. (Exits to hail his servants)

Curio: Cato cannot be ignored. He is an idea. All ideas are dangerous, the old more dangerous than the new. When Cato talks of virtue, the past rustles through his speech, the good remembered and all the old and rotten lost. Cato says the wars are over, extraordinary commands like Caesar's must end. And as he speaks of law, the Senate thinks how the law will share out Caesar's conquests.

Labienus: (Returning with servants bearing food) Talk. Talk. Talk. What the legions won is not for politicians to give away. Ignore them. Pompey's still the key. His troops will press upon the Senate more than Cato's speeches.

Balbus: So I got to Pompey, who told me he was Pompey, which I knew—too big for bargains. The Faction flatters him. Even Cato flatters him. He swells. Now, by leave of Senate, he drills recruits. He holds two legions at Capua—all in obedience to the Senate.

Curio: Pompey too wants Caesar small—but not like Cato who wants to keep Rome small. Pompey wants Caesar small so he alone is great.

Caesar: It does fit. All fits. But fits their way, not ours. Pompey has the troops, the Faction controls the Senate. Our troops are here, our voters far from Rome. Curio, what strength have we in open vote, among the people? I am only three weeks quit with being tribune of the people. What once were Romans now are mobs—ours and theirs, both monsters.

Balbus: They're organized, these mobs. Cato pays for one, Pompey for another, we pay for ours . . .

Curio: Rome lives with mobs that prowl like animals. When I was young, they kept their riots in Suburra, where the workers live. They used to kill each other and burn down houses.

Caesar: (Calmly, clinically) Yes, mobs like a flame.

Curio: These days they pour down out of the gully of Suburra, down from the hills, and burn inside the central city, inside the Forum.

Balbus: It was the mob that burned the Senate House to ashes that night two years ago. The Faction murmurs it was Caesar's mob.

Labienus: The Faction! It doesn't matter what the Faction says! Nor what the people say either. People are nothing unless they're organized, like soldiers in the legions, and marched in files to vote. You can't stuff them back into the gullies until you put the flat of sword against their back. And Pompey has the sword. We have to offer Pompey more, until we get elected.

Curio: No, and no, and no. Whatever Caesar offers Pompey the Senate will offer more. No one will bargain until Caesar draws his sword so men can see it.

Labienus: You draw our sword against Pompey? Who then could tuck it back into the scabbard? Roman legion must not fight Roman legion.

Caesar: Labienus, my man of war, wants peace. But Curio, my man of politics, wants just a glint of steel?

Curio: Just a taste. The sound of horns.

Balbus: The sound of horns, yes. Or parade. Just

one or two of Caesar's legions in triumph parade. The mobs will howl. Once there—we stay to vote.

Labienus: (Rising angrily, banging his cup) Oh, the talk of paper soldiers! Even if I agreed with you. To parade two legions in Rome and back them up with more here at the frontier? You talk as if miles, distances, mountains were not there. The Senate meets next week; debates another week; two weeks, perhaps three, before we even know what they decide. Mid-January by then, and snow blocking all the Alpine passes our backup troops must cross. Half our force watching Germans on the Rhine, two months march from here. The other half along the Rhone—four weeks to break camp and move the fastest of them here, even without snow in the passes.

Caesar: No. Ten days only, and we have two legions here. Ten more days, all four from the Rhone.

Labienus: How, Caesar? You talk to city politicians like a city soldier who never had to break a camp and set it on the march.

Caesar: If we light the signal fires here, this night, our Gallic legions march by morning.

Labienus: Impossible. Animals must be drawn in, food stocked. Weeks must pass. While Pompey also moves his legions north.

Caesar: Food is already packed, Labienus. Stores already stocked on the route. Signal fires, Gallic style, from hill to hill, already on standby for the call.

Labienus: (Separates himself from the group, stalks slowly across the stage, then turns at far right) By whose orders? I am Caesar's legate, chief of staff.

Caesar: By Caesar's orders.

Labienus: When?

Caesar: Three weeks ago.

Labienus: And I was not informed? Then all your messengers to Rome were liars? Balbus a liar? Hirtius a liar? Labienus a liar? I, who wrote to Pompey we have not moved a man? Pompey, who trusts me still . . .

Caesar: (Rising and crossing to the other side of the stage) By whose authority did you write to Pompey?

Labienus: I wrote as Labienus, your chief of staff and Pompey's old lieutenant. I wrote for peace. And now I was a liar—all of us liars. Or—or do all of you know? Curio, Hirtius, Balbus, Pollio? And only Labienus a fool, a witless liar? A battle hack trusted only to stand and fight?

Caesar: No legionary has moved, so no man is a liar. And no one knew but Pollio, who took my message. It is only a thought in my mind, not a deed. No single cohort moves until I raise a signal. And then Labienus, my chief of staff, gives the signal.

Labienus: I give no signal to march on Rome (Sits, head down, stunned). Caesar did not trust me. Whom does Caesar trust if not Labienus?

Caesar: (Crosses to stand behind Labienus) I not trust Labienus? Our first action against Helvetians nine years ago—who held them off when I raced back for reinforcements? When we crossed the Rhine, who led the vanguard? When I crossed to England and left the legions behind, whom did I trust? Who commanded all Gaul in my name?

Labienus: (Grudgingly) I.

Caesar: I not trust Labienus? When all Gaul rose two years ago and I came across the Alps in winter snow, who held it firm until I came? Who held the angle of the hill above Alesia through the siege?

Labienus: (Still grudgingly, yet stirred) I.

Caesar: (Runs his hand down Labienus' forearm, picks it up, examines the inner elbow) And here, all healed, the scar. Chief of staff dueling with a Gallic bladesman at the angle. Trying to make Imperator proud of him as if he were a centurion. Caesar not trust Labienus? I do not mistrust him because he wrote to Pompey . . .

Labienus: I did it for *you*. To *help* you. Pompey *trusts* me. You can't deal with him through a . . . a Balbus. I was Pompey's staff lieutenant in his pirate wars.

Caesar: You wrote without telling me. Yet I under-

stand. *I* am not angry. *You* are angry because I do not tell you what is only thinking in my mind.

Labienus: Caesar does not have to understand Labienus. Labienus *has* to understand Caesar.

Caesar: What is there to understand? I do not want to fight. Yet Rome is mine as much as theirs. I bring victory. I offer peace. I have the right to stand for consul. No law can strip me of this right, to stand me up for trial.

Labienus: I am afraid. I am afraid. Roman legion must not fight Roman legion. Do not let them turn you so Pompey has to fight us. Make peace with him. The eagles must not clash.

Caesar: But I have tried. I have sent messengers to plead with Pompey. Would you have me walk the road in person? Invite him to conspire, to purge the Senate until we two alone divide the world? Rome is more than what two generals decide.

Labienus: More than what one general decides. For 15 years, from Forum to the forests of Germany, I have followed the fantasies you dream—but now I cannot understand your dreams.

Caesar. You wish to be consul. So do I. We plan to stand together next year. Because what we have done these years beyond the Alps has swollen Rome so large it now must change. But what if they take away our dignity, even our lives, before we wear the consul's robes?

Curio: Rome will not change unless Caesar acts. No law is firm. Rome is Rome no longer unless Caesar acts.

Labienus: Who are you to say when Caesar acts? Who are you to speak for legions you never saw and never marched with?

Caesar: He speaks with my leave, Labienus.

Labienus: (Raging, turning on the others one by one) A city politician! A scribbling boy! A secretary on horseback! A smirking backroom bribesman! All have the right to speak, to counsel on what the legions do? How they march? Whom they kill?

Caesar: All here are equal. These are my men.

Labienus: (Scornfully) This is Caesar's court, not Caesar's camp. It stinks of perfume and reeks of courtiers, twisting and luring Caesar to their own ambitions . . .

Caesar: Labienus, guard your words. I am Caesar.

Labienus: And I am Caesar's chief of staff; next year,

Caesar and Labienus (Robert Blackburn and Seymour Penzner) discuss Rome's destiny at a reading. Labienus will wear soldier's battle dress (below).

Author White conducts preliminary reading with McCarter theater company. Tom Brennan (Hirtius) faces him; director Arthur Lithgow listens at right foreground.

full equal as co-consul. I am not a wooden blade to be drawn at will when other men have Caesar's ear. I am not a fool behind whose back a little boy is sent to mobilize my legions on the Rhone . . .

Curio: Not your legions, Labienus—Caesar's legions.

Labienus: Rome's legions. Rome's legions drawn to fight other Roman legions! (He pulls a dagger from his belt) This in a Roman throat?
(The diners are shocked at the sight of a knife in Caesar's presence)

Caesar: Labienus, put up your knife and go. Go before you say too much and cannot draw it back. I will talk to you alone. Go. And think a while. No legion marches. No signal fires are lit until the gods speak clear. Then—if signal fires are lit, the order passes through my chief of staff.

Labienus: I do not want to march on Rome. I leave you with your court. I go. (He sheathes dagger and leaves. All watch him go silently)

Caesar: (Returning to table, sitting) He fought with Pompey in the pirate wars when he was young—triremes slashing through the rolling sea. He still talks of them as any junior officer talks about his first campaign, his first commander. The memory glows. The sails are silver now, the oars golden, and he thinks of Pompey as a boy of heroes. Labienus joined me as a man, a partner; has seen me weep, has watched me bleed. He knows my faults and thinks me weak.

Pollio: Caesar weak?

Caesar: Weak. To bargain with men of politics. To listen to Curio and Balbus. They smell of Roman baths, incense, fragrant oils. To him an honest company is redolent with sweat, the smell of horses, armpits, unwashed robes. Rome to him is armies. Its vital spirit is the oath that binds the men in arms. Honors for him are earned in battle. To beg or bargain for the honor is beneath contempt. To snatch the consulship by force of arms is profanation. It should be freely offered. This leaves him with no way but Pompey to deliver us our vote—a soldier like ourselves.

Pollio: But other generals have marched on Rome and seized the consulship by arms.

Caesar: Sulla did when Labienus and I were young. All memory of Sulla tingles still with horror—Roman legion fighting Roman legion. The Republic could not stand a second shock—there Labienus is right. Sulla's legions held Rome and Rome held the world. Nor would the gods stay them once Sulla told the legions: Kill. Pollio, there's much to learn from Sulla.

Pollio: Sir?

Caesar: Many lessons—one of which is that gods bow to the legions, not the legions to the gods.

Curio: Caesar, Imperator, one caution: We speak in Caesar's quarters here. But this is what they wish to make you say aloud, at trial, in Rome—that Caesar repudiates the gods.

Caesar: Come now, Curio. I am High Priest. Who can make me say so? How?

Curio: At trial, for sacrilege. This is Cato's plan, I tell you. This is why the Faction must strip you of the scarlet cloak now; then summon you to Rome *before* elections, then stand Caesar up for trial—for sacrilege.

Caesar: But victory shows the gods have smiled on me for nine full years.

Curio: By the laws just passed, indictments run back 20 years. Thus all of Caesar's acts as consul ten years ago are called in question. There will be testimony that you ignored the omens.

Caesar: But the omens are largely nonsense, Curio, nonsense.

Balbus: Yes, Caesar. Nonsense. But Curio is right, too. If they can make you say "nonsense" in public . . .

Caesar: Every Senator knows it's nonsense. I observed the ceremonies—no one is more careful than I of ceremony. I put the chickens out before each Assembly. They hopped the way they should, they pecked or cast out grain to give the omens. I had those chickens trained myself.

Curio: Do not say that, Caesar. Every consul trains his own chickens. But if you say so . . . The College of Augurs will testify against you.

Caesar: (Pacing in a fury) I have been High Priest now for 13 years. Today, as Imperator, I stand with legions at my back. If the gods had messages to give, they would give them to *me*. Directly. Not through chickens, eagles, lightning, augurs. I plead with them. (Turning, back to audience, palms up in priestly stance, but rigid, not as a supplicant) I, Caesar, plead. I *need* to know. (Silence, as all watch) They do not speak. They *never* speak.

Pollio: (Writing in his tablet) Sir, not ever?

Caesar: Put away your tablet. Not ever. Sometimes when I thought I heard them speak it was only my own voice saying what I would say if I were a god.

Curio: What does it say, the voice?

Caesar: It says save Rome, but does not tell me how. It says Rome is not a city, it is the world. It says there must be mercy. And says every man must vote who is a citizen—within the city or beyond the walls. It says the men who fight for Rome must get their land, their share. And says an end is coming.

Curio: An end of what?

Caesar: That it does not say. I ask; Of me? Of the Republic? Of the law? No answer. I must find an answer. Whoever has the answer must be a god.

Curio: Caesar, Imperator. The answer's here in Caesar's grasp. Not there in Rome. No one can give answers any more but Caesar, who holds the Gallic legions.

Caesar: (Long pause) No. To end the laws of Rome by sword . . . No. Only Asians see their chiefs as gods above the law. I am only Caesar and I must find a way to make the law serve me. We must make an end to talk. As Labienus urged. And seek out Pompey's aid in working the law the way we want. Pollio!

Pollio: Sir?

Caesar: Find Labienus. (Pollio departs)

Caesar: (In torment) It is as if I were a river on which men choose to sail their boats, thinking it flows the way they want to go. They use me, all—my soldiers, tired of war, think of themselves as patriots—but what they want is land. Labienus wants to stand with me for consulship. What does Balbus want? He wants to be the first Spanish senator in Rome's history. If Caesar triumphs, Balbus is a senator. (Balbus smiles. If he were a dog, he would wag his tail) And Curio—what does Curio want? Command and wealth? Consul in some future year? Estates? No man cost me more to buy than Curio, but money never satisfies. What more does Curio want?

Curio: Caesar has paid me well. But money does not bind me. It's fear. I have been too often back and forth across the Senate floor. With Pompey, with the Senate, against Caesar, for Caesar. I tried both sides. If the others win, they will remember only when I stood against them . . .

Caesar: And if Caesar wins . . .

Curio: Caesar knows what to remember and what to forget. No gods will save me if Caesar is brought to trial and loses. I must believe in Caesar.

Caesar: Pollio should write this down. (Calls) Pollio? (Peers about at group—Pollio is absent) What does Pollio want? A writer needs a neat balance to his story. He needs some simple truth, a tree from which the twigs and leaves of episode and anecdote go neatly out. For Pollio, I must bring an order to his story. For Rome as well. They need an order. (Calls) Pollio!

Pollio: (Enters, perplexed) He's gone. Labienus has left.

Caesar: I told him to go and think. Find him. I need him now.

Pollio: He left this message.

Caesar: (Snatches tablet from Pollio. Reads) "Titus Labienus to Gaius Julius Caesar. Salutes. Caesar has said: Go think. I go to think. But can no longer think

Tailor displays bright bolts for Caesar's choice in an early scene. Scarlet is for a military Imperator, saffron for a high priest, white for a candidate. Also depicted is Caesar's golden stool.

in Caesar's presence. I must consult the gods."

Hirtius: He's gone to Rome!

Pollio: All else is there in chambers. His baggage, spoils, trophies. All remains behind. I asked. He rode off on his horse. Alone.

Curio: Caesar, we must be after him. He is just five minutes gone. If he has gone to Rome, to ask the gods their will, he'll not be back. Whatever works in Labienus' heart, in Rome they'll see him otherwise. Labienus is Caesar's chief of staff and running mate for consul. If he abandons Caesar . . .

Balbus: If Labienus leaves from Caesar's camp, it is desertion. I know the way they read in Rome. They'll read that all of Caesar's army revolts. Bring him back!

Caesar: No. Hirtius, give orders that all his baggage follow him. Pack it and speed it after him. It must arrive at the Rubicon before he does. With this message—Pollio, write it: (Caesar steps up to parapet platform, Pollio pulls out his tablet, Caesar dictates from afar) "Caesar, Imperator. To Labienus, Legate. Salutes. Caesar wishes Labienus well. Labienus has forgotten what he won. Thus Caesar sends Labienus' trophies, all his treasures to the Rubicon, waiting his arrival. Caesar's soldiers cannot cross the Rubicon. Else Caesar would have sent what Labienus earned to Rome."

Curio: No. Caesar, no! Labienus' flight destroys all chance of bargain. No one will listen if they think Caesar's own army turns against him. Bring him back.

Caesar: (Not hearing anyone) The message to go instantly with his baggage. Everything he owns. See to it. It is six hours from here to the Rubicon and Labienus will not hurry, for he is troubled . . .

Curio: Caesar's message will not bring him back once they talk to him in Rome—once he learns they can make him consul without Caesar . . .

Caesar: (Very remote on the parapet. Stage lights slowly dim) I do not want him back. Who follows Caesar must believe in Caesar. Labienus was too close for real belief. I crushed his dreams. Yet he grew from my dreams, as the nails of my fingers grow from my body. I cut him from me now as when I peel dead horn. I shall miss the cutting edge he gave command. But no pain.

(Pause) Yes, a little pain for memory, for what has gone before, when we were friends and partners.

More pain for what may come tomorrow. If he succeeds in reaching Pompey, he's a hero and I am safe but small. If he fails—then I must go on trial and lose all dignity, or die.

Or act as a god, in which case the Republic dies. And Labienus, who sought as I do to save it, he will die. For such a death – I have regret. But he was too close. No one must be close. (Caesar descends from parapet. His voice is cold, nasty) No more of counsel.

(He looks around) Hirtius, pass command. Nightly now, at first dark, then again at midnight, test the signal fires. Alert across the Alps. No man moves unless I say. But alert. Go now. Dismiss all. (Exit all, leaving Caesar alone, staring at the table with Labienus' cups and plates. Sweeps them into a heap, binds them into tablecloth. Opens Labienus' chest, pulls out helmets, trophies, bundles them, dumps them in the tablecloth. Hoists sack. Momentarily confused, then ascends balcony, sack spills and Caesar stoops to pick up the spill. He is getting rid of Labienus, and he picks up a helmet from the floor. He yells, as if losing control, as if Labienus can hear him)

Labienus? Can you hear me? Take it—take it all away with you. (Hurls the helmet) Labienus? I am not Sulla, Labienus. (Hurls a cup over the parapet) But I will not be a victim, Labienus. (Hurls another object) And I do not want to be a god. Tell them, Labienus. You know it has to change, Labienus—but tell them Caesar wants order as he changes it. They can have the spoils.

(Hurls a last object) Listen, Rome! Can you hear me? All I want to do is come and speak to you. I am a citizen. I do not want to be your god, only a candidate. Let me come. Let me come, I say, in peace. Without a sword. Do not make me march the legions. Do not make me a god. Listen. Do you hear me?

(As he ends in a shriek, the first signal fire flares) Do you see? Romans, can you see? (Signal flares again) Listen to me! (His voice is drowned in cheers, boos, catcalls, shriekings from out of the darkness)

Those are legions' fires! I do not want to call them. Caesar does not want to be a god!

(Caesar descends, exhausted, picks up and fondles a last trophy that has rolled downstage)

Curtain

But, nevertheless, Caesar dispatched Curio to try to win over the Senate in Rome. The signal fires flashed from Rome—a coded message; Caesar's envoys were fleeing the city. But Labienus, knowing the code and the method of transmission, cuts it off in Rome. Curio manages to show up at Caesar's camp and describes a leaderless city where men gather and whisper, where Pompey's troops patrol the streets. It is enough to push Caesar into his decision. Again the fires flare, this time northward to the waiting legions. In Pollio's words, "We cross the Rubicon at dawn." (See next page.)

Caesar's move brought the Republic down. He pursued his enemies and defeated them, then, a forlorn half-god, became dictator.

Renaissance tapestry at Bern, Switzerland, shows Caesar astride a white horse about to cross a roiling Rubicon. An allegorical "Rome" (maiden, left center) bars his way and chides him—according to the inscription. Moving toward the right, the tapestry depicts a battle scene suggesting Caesar's conquests on the way to Rome, discernible in the background. Legionaries wear 15th-century armor.

Historical Museum, Bern

Photographs by Constance Warner

Eyeing animals eyeball to eyeball

1. Frogmen, pearl divers and others require glass-clear goggles over the eyes.

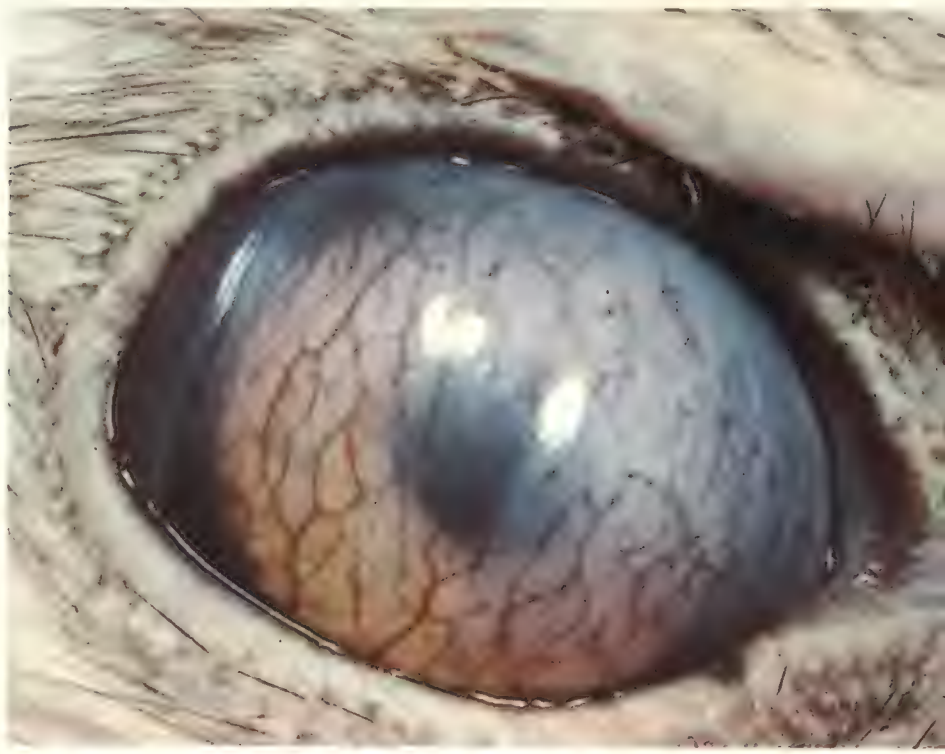
Readers are challenged to identify
the owners of these 22 eyes.
A trip to your local zoo may help.

Of all the ways of sensing the world around us, seeing it is by far the most awesome. That our fingertips respond to texture, that the fine structure of the nasal passages correspond so nicely with certain chemicals, that some complicated bones in the ear vibrate meaningfully in the head—all this is somehow less surprising than the idea that the world registers as images and patterns in the mind.

Seeing is all the more awesome when you realize that the eyes of each species are different and therefore, one must presume, transmit different images of the world. Every successful kind of creature sees what it must. Eyes are so designed—with a nearly endless proliferation of form and accouterment. One finds windscreens, goggles, windshield wipers, awnings, turrets, venetian blinds—all determined by such considerations as where the animal lives, or how fast it moves or what and when it eats, or by what it is eaten.

With all this in mind and with thanks to Mrs. Constance Warner who has photographed eyes of birds and other animals for the Smithsonian Institution's National Zoological Park, we present an animal-watcher's eye test. You will be highly successful if, from the panorama of eyes that appear on these pages, you can identify the owners of more than five eyes. Pay no attention to size; the scale is purely esthetic, not relative.

In an age where the withholding of immediate satisfaction is frowned upon, the answers are obligingly given on page 25. For the more disciplined, clues (of a sort) are provided in the captions.



4. A piratical eye glares from behind a porcelain-like third eyelid.

7. Binocular vision permits greater depth of field for handling objects.

2. One eye watches you; the other can look almost anywhere for insects.

3. An elongated pupil helps some mammals by extending their field of vision.

5. Eyelashes provide protection from the dust and glare of the trail.

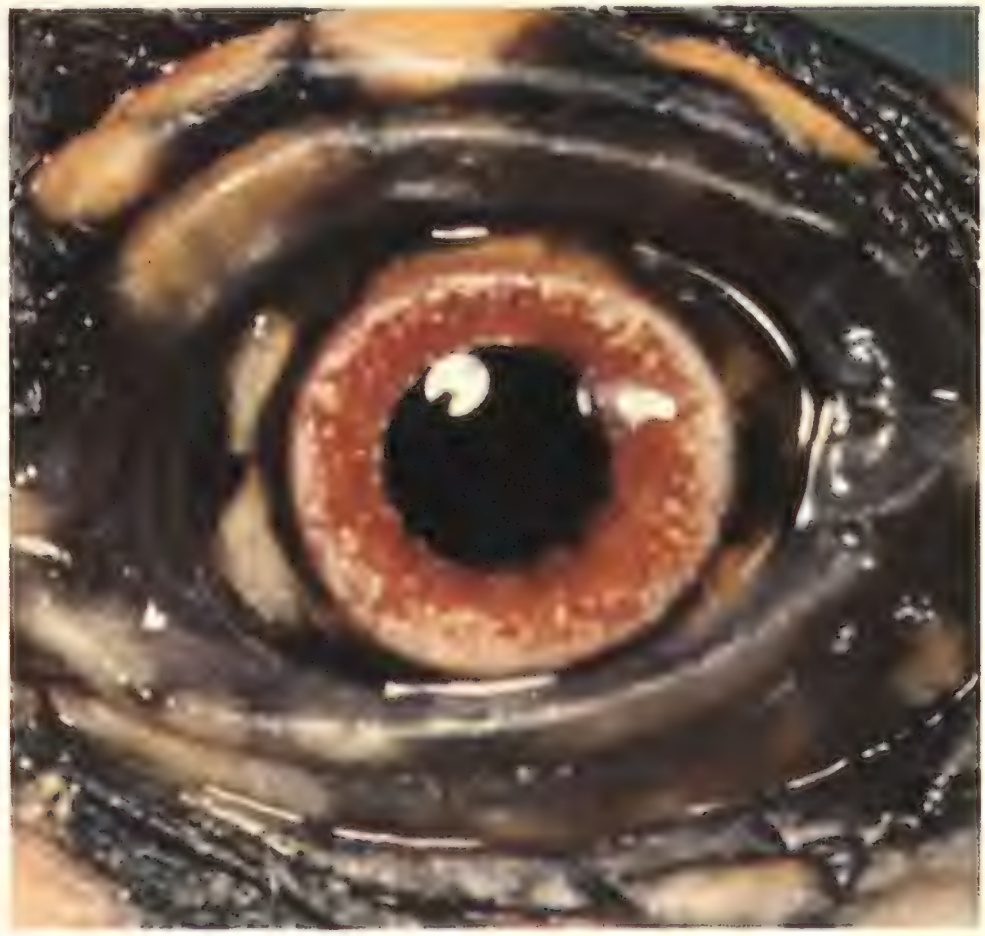
6. An "electric eye" zaps fish passing by overhead with up to 50 volts.

8. Another set of eyelashes, but what are they made of?

9. A bony canopy protects against glancing blows. See number 4.

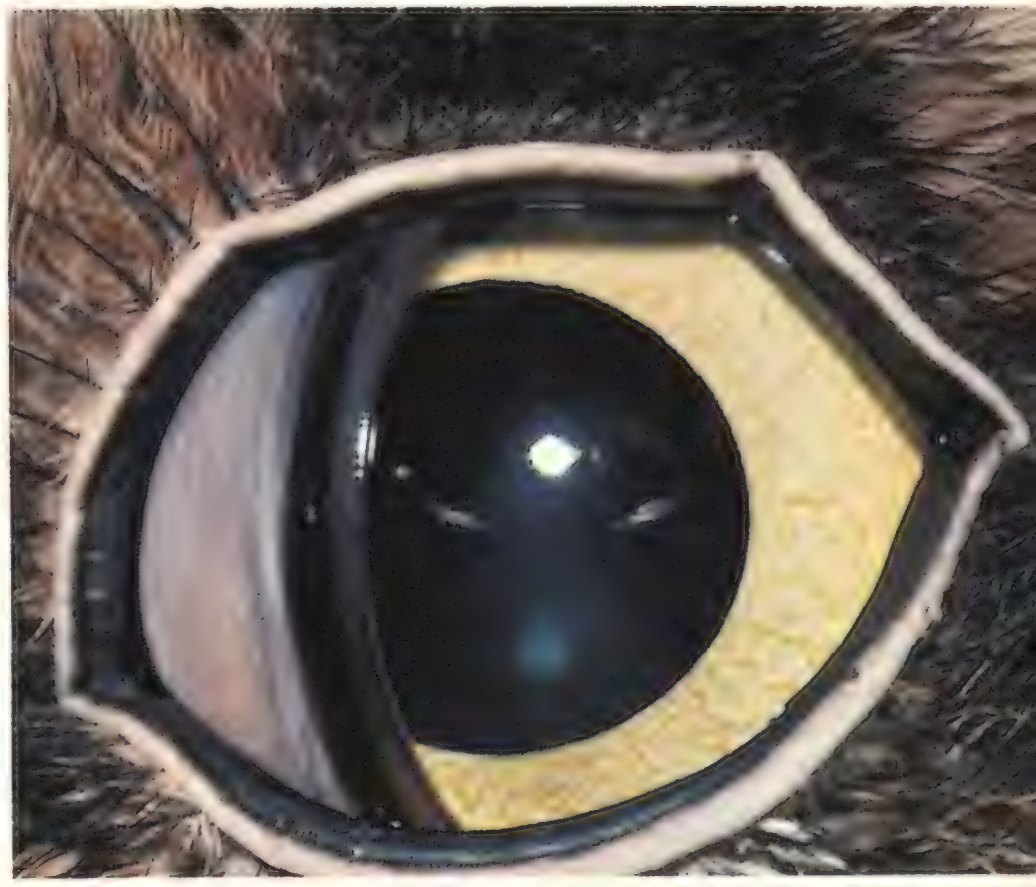
10. Coming from the dimness into the icy glare, it is helpful to wink.

11. A dome-shaped eye with the pupil open is bad for detail, but good for motion.



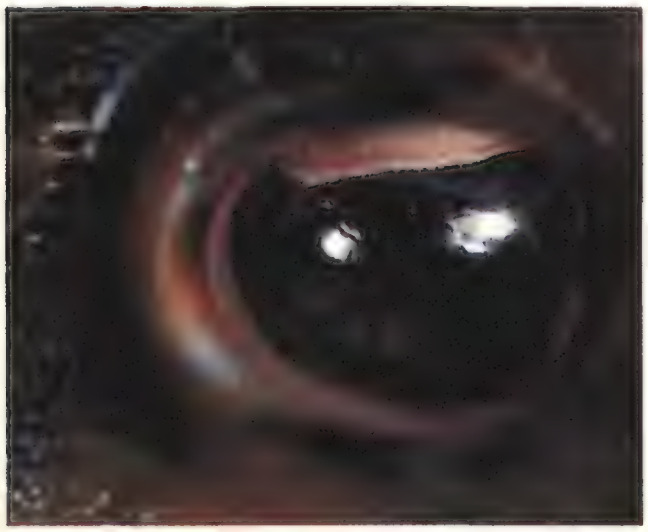
12. The males are usually red-eyed, the females are brown-eyed.

14. No science-fiction nightmare, but a device for regal reconnaissance.



15. When closed, the notched eyelid makes two tiny pinholes for bright light.

13. Like a windshield wiper, the third eyelid cleans this distant-seeing orb.



16. This compound eye can withdraw beneath a hard canopy.

17. For looking up into the glare, it helps to have a venetian blind.

18. With 50 times what shows here, this creature still can't see much.

19. More eyelashes, but this time they are made of scales.

20. In the daytime, the irises form four pinholes which in turn form one image on the retina.

Eye-test answers

1. The merganser duck is an accomplished diver.

2. The turreted eyes of the chameleon can revolve in separate directions simultaneously.

3. Goat.

4. This bird of prey is known to hijack the catch of other birds. See answer number 9.

5. Palomino horse.

6. Lurking on the bottom in waters from South Carolina to Brazil, the southern stargazer has eye muscles that are modified to emit electricity. Both eyes are on top, hence the fish's name.

7. Near the low end of the scale of living primates, the African potto sees at night but moves so slowly through the trees that it is known as the "softly-softly."

8. A bird, the hornbill's lashes are feathers.

9. Not even the bony canopy has protected the endangered bald eagle from the direct pressures of man.

10. The king penguin's pupil contracts through a series of star- and square-shapes. Then it winks.

11. House cat. You should have gotten this one.

12. Eastern box turtle.

13. King vulture.

14. One of the stalked eyes of the queen conch—it probably only sees light and dark.

15. Gray potoo, a tropical bird related to whippoorwills.

16. Lobster.

17. When the little skate approaches the surface, an organ called the operculum expands and partly fills the pupil.

18. The 100 or more photoreceptors of the scallop serve only to detect light and dark.

19. Iguana.

20. When the gecko's irises are contracted, this lizard's depth of field and the consequent sharp ness of image increases from "F4" to "F22."

The eye behind the camera

There is an aura of preordination in the photographs of Mrs. Constance Warner. A nurse, she worked for and ultimately married a distinguished eye specialist in the District of Columbia. Later, in preparing a paper for a local science group on the natural protection of animal eyes, she went to the National Zoological Park and found that no one there had thought much about the eyes of animals. That did it. With the help of zoo authorities, she set up a studio on the premises and began a long photographic career. She has traveled worldwide to photograph animals not available to her at the zoo and, with the exception of poisonous snakes, handles them all herself.

Some 40,000 transparencies later, Mrs. Warner is still hard at work. Currently, with camera ready, she awaits the hatching of some bird eggs.

She's riding over one of the biggest

This Dutch housewife was born the year oilmen began drilling near her home town.

When she went to high school, they were still drilling and still hadn't had any luck.

But the drilling went on for good reason. Holland had very little domestic oil and urgently needed more energy for industry.

In 1959, after thirteen years of drilling and some two hundred dry holes, Jersey's Dutch affiliate and its partner finally struck something big. Not oil. But gas. Ten thousand feet under the local sugar beet fields, they found the largest single source of energy ever discovered in Europe.

This discovery, called the Groningen Field, has caused quite a stir on Holland's home front. Old-fashioned coal stoves are disappearing and practically all gas-operated appliances have been converted to natural gas. It took five years and about $180 million to do the job.

There's a similar story in industry. About 65 per cent of Holland's larger factories have already converted to the new fuel.

But Holland isn't alone in feeling the effects of Groningen. Over four thousand miles of pipeline now allow Holland to export gas to Germany, Belgium and France, where it runs

things that ever happened to Europe.

steel mills, power plants, breweries and even heats sidewalk cafes.

Visit the Groningen Field today and it's difficult to believe that you are standing on top of one of the biggest things that ever happened to Europe.

Pipelines are buried. Digging scars have been healed by re-seeding. And hundreds of trees have been planted around the main compressor station. Not just for their beauty. But to muffle noise and preserve the peace.

Seagulls still soar over this lonely station. Cows graze and people camp nearby. All as if nothing had happened.

We are rather proud of this.

Standard Oil Company (New Jersey)

Esso

By Alfred Frankenstein

Painted memories: folk artists are back on the scene

Grandma Moses is dead, but Grandpa Wiener is livelier than ever—like other self-taught American painters who are enjoying a revival

Historical societies are supposed to record history, not make it. But the New York State Historical Association intervened in history rather dramatically last summer when it gave Grandpa Wiener (right) the first one-man show of his painting career in its galleries at Fenimore House in Cooperstown. This exhibition closed a circle that had taken 32 years to complete itself, and it doubtless launched a new cycle whose end is nowhere in sight.

With this display the New York State Historical Association, proprietor of one of the country's major collections of 18th- and 19th-century native folk art, recognized for the first time the importance of the contemporary folk artist.

There are now many collections like that of the Cooperstown museum. The most celebrated outside of Cooperstown itself are the Abby Aldrich Rockefeller collection at Williamsburg, Virginia, and the collection of Bernice and Edgar William Garbisch at the National Gallery in Washington, but there are numerous smaller repositories of the same sort elsewhere. Not one of them existed 35 years ago. Even though they are all the product of recent interest, their concern without exception is with American folk art before 1900. Their verb is "was," not "is." But when the

Alfred Frankenstein is widely known as art critic of the San Francisco Chronicle, *professor of American art at Mills College, and author—among other books—of* After the Hunt, *a study of American still lifes.*

The Crossing of the Red Sea is Isidor "Grandpa" Wiener's version of the Old Testament tale.

New York State Historical Association

New York State Historical Association

Courtesy of Nina Howell Starr

Henry Jackson's *Christ,* the work of a black artist who paints murals in storefront churches, may suggest the hidden treasures of these places of worship.

whole thing began, in the middle 1930s, the emphasis was almost exclusively on the present tense.

In bringing the emphasis back to the present tense with its Grandpa Wiener show, the New York State Historical Association once again made folk art a lively, controversial, contemporary issue—as it was in 1938, when the Museum of Modern Art presented the first exhibition of contemporary folk art ever offered in the United States.

This exhibition, called "Masters of Popular Painting," was held in collaboration with the Grenoble Museum, and half of it was French. How seriously it was taken is indicated by the opening lines of the preface to the catalog, written by Alfred H. Barr jr., then the director of the Museum of Modern Art: " 'Masters of Popular Painting' is the third of a series of exhibitions outlined in 1933 and intended to present some of the major divisions or movements of modern art. The first, 'Cubism and Abstract Art,' was held in the spring of 1936; the second, 'Fantastic Art, Dada and Surrealism,' opened at the end of the same year."

Grandpa Wiener did not supply his *Witch in the Woods* with a specific program, but it may reflect his memory of Moldavian folk tales heard in childhood.

No museum director today would place the work of these naive or "primitive" painters on an equal footing with cubism, abstract art, Dada or surrealism, but even stranger things can be found in the various essays of that catalog; strangest of all is a statement by Maximilien Gauthier in his introduction to the French half of the show. Before turning to it, one should point out that the avant-garde in Paris had recognized and joined forces with the naives ever since the famous dinner that Pablo Picasso had given for the Douanier Rousseau in 1908. André Bauchant, Camille Bombois, Louis Vivin and the other French artists introduced to the United States in the 1938 show at the Modern Museum were well known at home, but their opposite numbers in America—Thorwald Hoyer, Patrick Sullivan, Horace Pippin—were all, with one exception, completely obscure; among the Americans, only John Kane had any kind of reputation, and his was only at its start. Said Gauthier:

"The Cubists and their friends were the first to be taken with the *Maîtres Populaires de la Réalité,* especially with Henri Rousseau. They wanted their pictures to contain something other than the official recipes for academic beauty and something other than Impressionism. The Impressionists had consecrated art to the rendering of delicate sensations. The Cubists wished to reintegrate in art human feeling and human thought. And they recognized that this is what Rousseau had done, in his own way, making more use of heart and impulse than of mind and will, attaining 'naively' the objective toward which they were reaching intellectually.

"At present, when we see that most young artists are no longer concerned with abstract design but fight instead for a return to subject matter, the human element, the eternal verities, it looks as though the *Maîtres Populaires de la Réalité* have, in the end, won the day."

Incredible and prophetic

The first paragraph of this, with its parallel between the experiments of the modernists and the discoveries of the naives, is familiar enough and makes sense; the second paragraph is both incredible and prophetic. It is incredible because, looking backward from the present day, one can perceive no trace of a fight to return to subject matter among the young artists of 1938; it is prophetic because a return to subject matter *is* precisely what happened among young artists a quarter of a century later.

In 1938 abstraction was just tuning up for the complete domination of the field which it enjoyed in Europe and America throughout most of the '40s and '50s. Because abstraction *did* lord it over the scene

during those two decades, folk art, which always clings to the subject, passed out of the picture as a contemporary force. But interest in folk painting had been aroused, and since it could not be maintained on the contemporary level, it turned to the past; it was then that the above-mentioned collections of historic American folk art were formed.

Back on the scene with Pop

Subject matter came back to the museums and studios in the 1960s with Pop, neo-Dada, the "New Realism" and a general relaxing of insistence upon abstraction as the *sine qua non* of modern art. And, as one might expect, contemporary folk artists promptly returned to the scene. Pop art was, indeed, closer to the spirit and achievement of these "masters of popular painting" than the art of the studio and the museum had ever been. One-man shows for living folk painters once again became a frequent phenomenon in the museums and galleries; the Museum of Early American Folk Art in New York dropped the "Early" from its name; and, as we have suggested, a one-man show for a living folk artist in an antiquarian folk-art museum finally closed the circle.

The catalog of that 1938 exhibition raises another issue which is of considerable importance today. In his introduction to the American section of the show, Holger Cahill introduces social significance, which had not concerned his French colleague in the slightest. This is the art of the people, says Cahill, bringing in the government art projects and other aspects of the post-Depression political and social scene; no one then living in America could forget them. Today we are once again conscious of society, the common man, and his fate in a world of war and recession—more so than at any time since Cahill wrote.

Interestingly enough, neither Gauthier nor Cahill mentions one aspect of folk art which has since become of enormous interest: its dealings with the fantastic and its revelation of the psychological. This is discussed for the first time in American writing on the subject in Sidney Janis' superb book of 1942 entitled *They Taught Themselves.* The book is a study of 30 American folk artists then alive and at work—it was the last major expression of its kind before the high tide of abstraction swept everything away—and in it the author thoroughly psychoanalyzes his 30 subjects.

All the qualities that the authorities single out as characteristic of folk art can be found in the work of Isidor Wiener: naive anti-academic originality in drawing and paint-handling, social significance, fantasy and psychological revelation. His life story, too, is generally typical. He was born in Moldavia, which is half in Romania and half in the Soviet Union, in 1886 and came to this country in 1903. He had all manner of jobs around New York City—hatmaker, welder, milkman, gravedigger—but for most of his active career he ran a little "Pop-and-Mom" grocery store in the Bronx. An unusual aspect of his history is that his son became a photographer against his father's opposition—opposition so bitter that the son, Daniel, changed the spelling of his name from Wiener

Courtesy of Mr. & Mrs. Sterling Strauser

Lily in Boot was painted by William Fellini in 1953, but no other facts about the artist are known.

Train in Coaltown is by Jack Savitsky, a 70-year-old miner who paints industrial Pennsylvania.

Courtesy of Herbert W. Hemphill jr.

to Weiner as an act of defiance and release. But it was this son, long since reconciled, who suggested that the old man take up painting after his wife had died and he had retired from business. He started in 1959, signing his work "Pop Wiener," but after Grandma Moses died in 1962 he started to call himself Grandpa.

"I paint from memory," he said in an interview. "I remember Romanian fields, sheep, animals—I used to go in the woods—flowers, stuff like that. In the city of Kishinev we had a flower garden . . . such a beautiful garden . . . That's all you could see, colors, colors everywhere you went. Falcons. I like those birds, so I paint them. When you are small, you learn the Bible, you know, and I remember that."

The painting of memory is the core of folk expression wherever you find it. Many old people write their memoirs, but a Wiener, a Moses, a Rousseau or a Kane paints them. And the fact that folk painting is largely a memory catalog accounts for some of its most striking stylistic peculiarities. Since the artist is not recording observed fact, he is released from the pictorial conventions whereby observed fact has traditionally been set down—especially the conventions of scale and perspective. Space tends to be rendered two-dimensionally rather than in three-dimensional depth. The size of represented objects depends upon their importance in the artist's mind, not upon their actual physical bulk, although objects in foregrounds are almost invariably dwarfed because that is the only way in which they can be got into a two-dimensional system and leave any space for objects behind them.

That Grandpa Wiener remembers the gardens of Kishinev (much as Arshile Gorky remembered the garden of Sochi in Armenia) is amply apparent to anyone who has seen any of his canvases, with their acres of flower beds and blooming trees. His biblical scenes set him apart from most western folk painters. *Crossing of the Red Sea* (pages 28-29) is drawn with Pharoah's army drowning in the middle of the picture, Moses huge on a promontory at the right and behind him the rescued Israelites, all in modern dress, some carrying the valises in which they had packed their things for the trip. Although Grandpa remembered the Old Testament from childhood, he did not remember the Orthodox Jewish prohibition against the representation of the human figure; one suspects, however, that the delightful decorativeness of his work stems in part from the intense, interlaced, abstract ornamentation in which Orthodox Judaism expresses its impulse toward the visual arts.

Painted memories

Grandpa Wiener also remembers the folk tales told in the Moldavian countryside; his *Witch in the Woods* (page 30) appears, at least, to reflect such tales, as do other paintings of his, although he has never offered program notes on any of them. What Robert Louis Stevenson wrote about Brother Michel Blanc, the French folk sculptor and architect who served the missionaries in the Marquesas, could well be the last word on Grandpa Wiener: He "combines the childish courage of the amateur, attempting all things, like the schoolboy on his slate, with the manly perseverance of the artist who does not know when he is conquered."

Not long ago the Museum of American Folk Art staged a large, broadly inclusive show of living American folk artists. The most remarkable aspect of this exhibition was its heavy emphasis on religion: Christs, angels and sacred visions of many kinds abounded.

Fervid religious themes

One effect of New England Protestantism, which carried on the old Jewish prohibition of the religious image, is that religious themes have played only a minor part in "cultivated" or academic American painting and sculpture. But it almost seems as though the taboo on these themes in sophisticated circles has acted as a spur to their employment by the unsophisticated. Henry Jackson (page 31), a black man in Chicago, has been painting murals in storefront churches for the past ten years, as has Aaron Miller of San Francisco; indeed, one suspects that many of the churches in black districts, drab as they may be outside, are ablaze inside with pictures as fervid as the gospel song of their congregations and choirs.

There are many contemporary folk artists, however, whose inspiration is largely or entirely secular. Fanny Lou Spelce, for example, who lives somewhat reclusively in a small town in Texas, paints recollections of such events as the arrival of a train in a Great Plains village many years ago (page 35).

An "unknown" surrealist

The most mysterious of modern American folk artists is one William Fellini, who has been identified only because his pictures are signed and dated. They have been found in junk and secondhand shops around New York, but not one iota of information about the man himself has ever been discovered. Of all contemporary American folk artists, his work is closest to that of the orthodox surrealists; indeed, if it were not for the false perspective of the marble table (which is really continuous with the flat wall presumed to be behind it) his *Lily in Boot* (page 32), with a carnation growing out of a hole in the toe, might almost pass for a painting by the celebrated Belgian surrealist René Magritte.

Jack Savitsky is a 70-year-old coal miner from Pennsylvania who, like John Kane before him, paints scenes from his native state, but with the kind of inventiveness, typical of folk artists, that places little houses around the four sides of a canvas, framing his *Train in Coaltown* (opposite), in a manner not unlike that of medieval maps, with their four rivers flowing out of Paradise to the cardinal points of the compass.

Victor Joseph Gatto, who died in 1965, was entirely a painter of fantasy. He was born in New York in 1893 and won prizes for drawing in school. He became a heavyweight prizefighter, then a plumber's assistant and steamfitter. In 1940 he fell ill, took up painting once again since he could no longer engage in physical labor, and for a quarter of a century he worked on canvas. "I can paint anything," said Gatto, "deep-sea pictures, jungles, wild horses, even Heaven. I can paint it all out of my head." His *Peaceable Kingdom* (opposite) derives from the same passage in Isaiah as the numerous *Peaceable Kingdoms* of Edward Hicks, the 19th-century Quaker preacher, and was doubtless inspired by them. To be sure, Gatto's lion seems to be lying down with a goat rather than a lamb, but there is indubitably a child playing "on the hole of the asp," at the lower right, on the shore of the lake with the paired swans.

All the people mentioned here differ only in details from those with whom Janis dealt in 1942 and those about whom Gauthier and Cahill wrote in 1938. As Gauthier would have put it, if he had been fond of proverbial clichés, *plus ça change, plus c'est la même chose*. But one thing really *has* changed about American folk art: the world's attitude toward it. This is one of the few things today which has definitely changed for the better.

In *Night Train* Fanny Lou Spelce records the arrival of a passenger train in a small Texas town.

Peaceable Kingdom is Joseph Gatto's version of Isaiah 11:6-8, which also inspired the 19th-century Hicks.

Courtesy of Mr. & Mrs. Sterling Strauser

Electrocardiogram by telephone.
Now a heartbeat can be transmitted instantly to a doctor hundreds of miles away.

When someone has heart trouble, he frequently needs a heart specialist.

Somebody who's highly trained in the reading and interpretation of electrocardiograms (EKG's).

Now there's a way to speed an EKG to a specialist no matter where he is.

By telephone.

The doctor or visiting nurse who attends the patient brings special equipment along (it's standard in many medical centers and hospitals).

The specialist has similar equipment at his end.

When the regular telephone connection is made, the specialist receives a duplicate EKG as it's being given.

He can then analyze the results on the spot. And without hanging up, confer with the doctor or nurse at the other end.

The American Telephone and Telegraph Company and your local Bell Company work to make the telephone serve you as many ways as possible.

One way is to let a doctor send your heart pattern 3,000 miles across the country on the same phone you use to call the druggist.

Neither a carnival fire dance nor an insane nocturnal auto rally, but fireflies in an aquarium wandering before an open shutter.

By Irene Kiefer

Nature's light show, starring the beetles and jellyfish

Cold, efficient, mysterious—living light is yielding new chemical secrets and is finding many human uses

A firefly flashes in the dusk of a warm summer evening and a child asks a question men have asked for centuries: "How does it do it?" This simple and ancient wonderment over so magical a phenomenon has given way to the orderly curiosity of the scientist, and living light, or bioluminescence as it is called, is now giving up some of its secrets. From the work of a relatively few scientists—probably no more than a dozen or so research groups mostly in this country and in Japan—a far better understanding of the chemical reactions involved in bioluminescence has evolved. We now know the identity of some of the specific chemicals that produce light and how they react. Several of the important firefly chemicals, as well as those from other animals, have been made in the laboratory. The synthetic firefly materials are now being put to a variety of uses, such as clinical testing for urinary infections.

The child may quite naturally see the firefly as a bug with a light bulb it can turn on and off at will. But, grasping one, the child's hand is not burned as it would be by holding the electric bulb he finds analogous. Bioluminescence is cold light. Extraordinarily efficient, it gives off almost all its energy as light, wasting little in the form of heat.

Following a stint as a chemist for du Pont, Irene Kiefer worked for two chemical magazines and has since written widely on chemistry and on environmental matters.

More than 40 different taxonomic groups of living things include bioluminescent species but they show no clear-cut evolutionary lines. One species may be luminous while another closely allied species is not. A striking peculiarity of the distribution of light-emitting creatures is that almost none live in fresh water.

Among plants, only the simplest—some bacteria and fungi—emit light. Individual bacteria cannot be seen by their own light, but as colonies they are readily visible. A dead fish or squid you might see glowing on the beach at night is not itself luminescent; it has been covered by a colony of luminous bacteria. Pure cultures of bacteria emit a strong blue or blue-green light, which is the most common color of living light. Fungi are responsible for the luminescence sometimes seen in rotting wood.

Plant light is steady, shining with uniform intensity. Animal light with a few exceptions, comes in concentrated flashes when the creature is stimulated. A wide variety of lower animals possess the organs, often called lanterns, that give off light: protozoa, sponges, corals, worms, jellyfish, crustaceans, clams, snails, squid, centipedes, millipedes and insects. More than 100 luminous species have been found among fish, the highest form of life to exhibit luminescence.

There are some deep-water fish with rows of lights like portholes along the sides of their bodies, which act as miniature spotlights. There are others which contain the luminous organ on a retractable appendage. An Indonesian fish has white pouches under its eyes in which luminous bacteria live and emit light continuously. This live fish is a source of food for the bacteria; the bacteria provide light for the fish. The eye is equipped with a black eyelid-like cover which can be drawn over the pouch to turn the light off.

The value of luminescence to a living creature is, in most instances, far from clear. Among the simpler

A click beetle's "bleeps" of light are recorded on film; a second beetle has exited, flashing, at right.

organisms, it serves no obvious purpose. Some scientists speculate that among bacteria it may be a vestigial trait that developed early in the evolution of life on the planet as a means by which primitive forms eliminated oxygen from their systems. Or it may have resulted from a slight change in a group of chemical compounds. Among more advanced bioluminescent creatures—for example, those living deep in the sea—it may have evolved secondarily as a means of helping to scare predators away, to attract food or mates. Some squid and other marine animals seem to use luminescence as a protective screen. The purpose of the firefly's light has been definitely established. Each species has a characteristic flash. The male of *Photinus pyralis,* for example, a common American species, sends out a single flash of yellow light at precise intervals. The female, recognizing the flash of a male of her species, responds with her own flash, and the exchange is repeated until the male finds the female. Mating then takes place.

Detailed chemical studies have been made on fewer than 20 of the many species that produce light; the firefly has probably been the most widely investigated. Actually a beetle, it is found in many parts of the world, along with glowworms, the wingless larvae of newly hatched fireflies. In England, where fireflies do not occur, Robert Boyle in the late 17th century established many of the basic properties of bioluminescence —for example, that virtually no heat accompanies the light and that the light requires "air" (actually, oxygen). Chemical studies of light-producing organisms did not begin, however, until 200 years later when, in the 1880s, the French physiologist, Raphael Dubois, experimented with a West Indies firefly and a bioluminescent boring clam.

He ground a light-producing tissue in cold water and after several minutes, the glowing substance in the water faded. Then he ground a second portion of tissue in hot water and cooled it quickly. There was no glow in the water, but when he added it to the first liquid, the light reappeared. Dubois realized that there had to be two substances involved in producing the light. One was responsible for emitting light and he named this material luciferin after the Latin lucifer, meaning light-bearing. The other he named luciferase, the suffix, "ase," indicating he thought it was an enzyme, a catalyst produced by living cells that initiates or increases the rate at which organic chemical reactions take place. Dubois concluded that the cold liquid extracted both substances. The hot liquid, however, extracted only luciferin, since luciferase was inactivated by the hot water. After the luciferase in the first (cold) liquid had been used up and the glow had faded, the luciferase remaining reacted with the luciferin present in the second (hot) liquid. And the light reappeared.

In addition he found that the luciferins and luciferases of the firefly and the clam were chemically different and biologically specific—that is, the clam's luciferin would not produce light with the firefly's luciferase, or vice versa. Subsequent research has verified the observation: With rare exceptions, light is pro-

duced only when the luciferin and luciferase come from the same, or closely related, organisms.

In 1916, Dubois sent a jar of luminescent tissues preserved in sugar to a young biologist, E. Newton Harvey, of Princeton University. Harvey's research in bioluminescence was just beginning and over the next 40 years, working with a group of students and colleagues that included his biologist wife, he studied virtually all aspects of bioluminescence. He established that the luciferin-luciferase reaction requires oxygen, and he discovered several more organisms that produce light by the same reaction. He is remembered especially for his work on a small crustacean, *Cypridina* which occurs in the coastal waters of Japan. This creature secretes luciferin from one gland, luciferase from another, and on combining in water, the two substances produce a cloud of blue light. Japanese soldiers in World War II placed dried *Cypridina* powder on their hands; adding water, they would have sufficient light to read a map. But in the majority of luminous species he studied, Harvey could find no evidence of a luciferin-luciferase reaction. Nonetheless, for many years, scientists clung to the idea that every bioluminescent system had to have two separate components and that finding them was merely a question of using the right methods.

Indeed, bioluminescence provides the researcher with some very knotty problems of method and technique. Since the late 1940s, a group of scientists at Johns Hopkins University in Baltimore, Maryland, has removed much of the mystery from how the firefly makes light. Until mid-1969, the group was headed by Dr. William D. McElroy, who left Hopkins to become director of the National Science Foundation. When the research was getting underway, McElroy—one of Harvey's former students—faced the problem common to all who study bioluminescence: getting and preserving the organism in large quantities. He offered to pay 25 cents for each 100 live (or at least fresh) fireflies. Once in the laboratory, the fireflies are immediately dried to prevent deterioration. For many years, Hopkins bought almost a million fireflies annually from Baltimore children; a few years ago, the university sublet the collecting to an outside agency.

Synthesizing luciferin

Early in the work, McElroy discovered that an essential component of the firefly light system was adenosine triphosphate (ATP), an enzymatic material that plays a key catalytic role in the transfer of energy, such as in muscle contraction, in most biological processes. (It has been found since that such special "cofactors" are frequently necessary in bioluminescent systems.) From there the Hopkins scientists attacked the difficult task of purifying and isolating luciferin. Luciferin is present in infinitesimal amounts —about 1,500 fireflies give up only one milligram— and it is found associated with other substances that are similar physically and chemically, so it is hard to obtain in pure form. And, of course, material was always in short supply—five milligrams was about as much as was on hand at one time. It takes 28,350 milligrams to make one ounce.

Not only was luciferin hard to come by, but it deteriorates in the presence of very small amounts of oxygen. But over the years, the Johns Hopkins group isolated luciferin in pure form. Finally, in 1961, a Hopkins research team headed by Dr. Emil H. White determined that luciferin contains 11 carbon atoms arranged into three rings and confirmed the structure by making it in the laboratory. The luciferin of every species of firefly studied to date is the same, and the structure is probably the same for all species. The synthesis, although not "easy" as the synthesis of complicated organic chemicals goes, was an improvement over wresting luciferin from fireflies.

Once they had pure luciferin, the Hopkins researchers were able to determine that the light-emitting process is 100 percent efficient, producing one unit of light for every molecule of luciferin oxidized. No

energy whatsoever is wasted as heat. A number of bioluminescent systems have efficiencies in the 25 to 30 percent range—still far above the yields of nonbiological substances that also produce light by chemical reactions, which may run only a few percent.

Work also proceeded on luciferase. A group headed by McElroy purified and isolated it, then in 1966 established its structure as a protein of 19 kinds of amino acids.

White, meanwhile, continued to study how the light is produced. Earlier in his career, studying the luminescence of simpler, nonbiological materials, he had discovered that a group of atoms containing two carbon and two oxygen atoms joined in a ring is crucial in the series of oxidation reactions that produced light. Following through on this hunch, he determined by 1967 that the same group does indeed play the same crucial role in the oxidation reactions producing the firefly's light. Similar chemical mechanisms have been found to be involved in the Japanese crustacean, *Cypridina,* though its structure (which is now known) differs from the firefly's, and no ATP is required.

In the last decade, other researchers at Princeton have established the structure of, and also synthesized, the luciferin from *Latia,* a limpet found around New Zealand and one of the very few freshwater organisms that can produce light. Considerable research has been done on luminous bacteria, which are easy to grow in the laboratory. The chemistry is remarkably complex for such simple organisms, with several different materials involved in producing light. One of these has sometimes been called a luciferin, but whether it should be is still open to question.

In recent years, Dr. Frank H. Johnson (also of Princeton and another of Harvey's former students) and Johnson's colleague Dr. Osamu Shimomura, have suggested that a single protein molecule is responsible for the light of the jellyfish, *Aequorea.* Averaging about three inches in diameter, these jellyfish are so common during the summer off the coast of Washington and British Columbia that they annoy swimmers and clog salmon nets. For several summers, the Princeton investigators have journeyed cross-country to the University of Washington's Friday Harbor Laboratories to tap so ready a supply, and with the help of local teen-agers and other assistants, they have collected some 125,000 jellyfish—about six tons of total biomass, but far less of bioluminescent material.

Aequorea produces its light in tiny, yellowish organs ringing the outer edge of its body. This thin ring, which constitutes less than one percent of the organism, must first be stripped away. Although Johnson tried numerous devices to speed up the de-ringing process, until recently he and his assistants had to fall back on the homely expedient of using a pair of scissors. Finally, in 1969, they succeeded in building machines that cut the rings off quickly and neatly. By a series of laborious processes, Johnson and Shimomura extract the light-emitting protein from these rings and purify it. They have named it "aequorin" and, at best, they get about 100 milligrams of pure aequorin from about 25,000 specimens (which is considerably more productive than Dr. McElroy's situation). All aequorin needs to produce light in water solutions is calcium or strontium salt. Thus, Johnson and Shimomura feel that this is not an instance of a luciferin-luciferase activity. They prefer the term "photoprotein." Photo-

One of the many light-emitters of the sea, the fireworm performs a flashy mating dance, keyed to the full moon, in Bermuda.

protein systems are also responsible for the light of *Halistaura,* another jellyfish; *Chaetopterus,* the paddleworm; and *Meganyctiphanes,* a type of shrimp.

The studies of aequorin led Johnson and Shimomura to speculate about the nature of bioluminescence reactions. All these reactions, they point out, involve a protein—either the photoprotein or the luciferin-luciferase system, in which the luciferase is the protein and has the catalytic properties of an enzyme. The difference, they believe, may just be that in the photoprotein the essential chemical components are tightly bound into one molecule, rather than being easily separated into luciferin and luciferase components. They have pinpointed the specific part of the aequorin molecule that is the source of light, but it is such a small part of the molecule—no more than one percent by weight—that they have not been able so far to get enough of it to arrive at its structure. When they do, it should be possible to synthesize it, and perhaps even combine it with some suitable and readily available protein to make a semisynthetic material that works like aequorin.

Putting bioluminescence to use

Science for the sake of pure knowledge—akin to the child's curiosity—has been the motive force behind most studies into the chemistry of bioluminescence, but practical human uses for this phenomenon have also long been sought.

The U.S. Office of Naval Research has supported the studies of the jellyfish *Aequorea* for a number of years, hoping that an understanding of its luminescence might lead to such items as documents that light up as needed or to lighting systems for vessels operating secretly. Some of the results of this research have already been put to practical use. Since calcium salts trigger *Aequorea's* lighting system, it provides a fast, sensitive and specific test for minute amounts of calcium salts—a test that is finding increasing use in various kinds of basic research. Strontium salts also trigger the lighting system, so in principle it could be used to detect radioactive strontium in fallout from nuclear explosions.

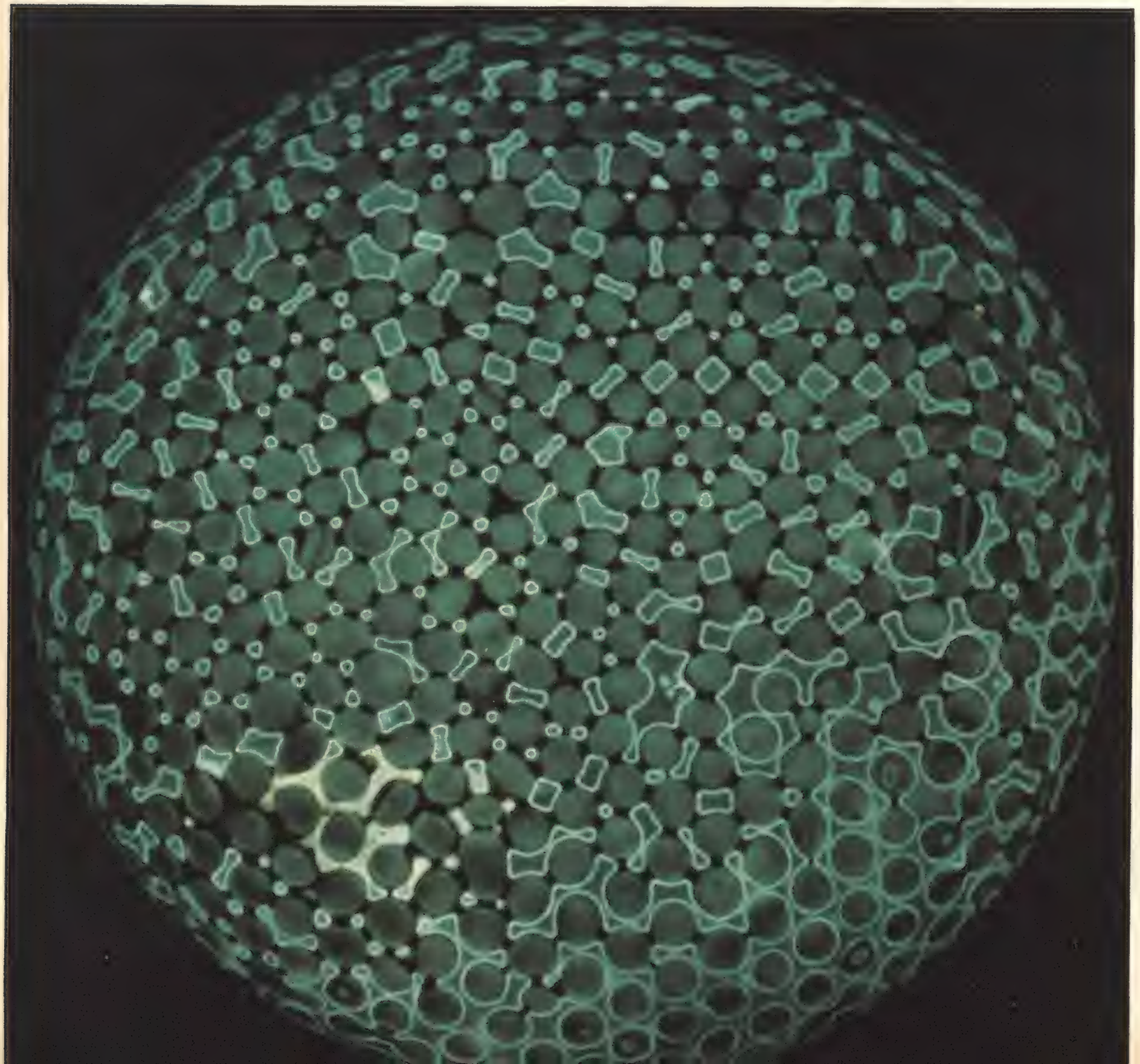
In general, scientists use bioluminescence to study other life processes where it offers this big advantage: The light produced is easy to measure and serves as a built-in, visible indicator of the reactions taking place. Luminous bacteria, for example, provide a tool for studying the influence of temperature, pressure, narcotics and other chemical agents in biological processes and may prove useful in detecting toxic fumes in spacecraft. Biochemists have used the firefly system to study the role of ATP in muscle contraction, nerve and brain function and photosynthesis.

The light emitted by plants is steady and of uniform intensity. Mushrooms above are photographed (below) in their own light.

The firefly's chemical system is also the basis of a new test to diagnose urinary tract infections. The test had its inception not in a clinical laboratory, but in the Goddard Space Flight Center of the National Aeronautics and Space Administration. Several years ago, NASA began looking for ways to detect life in the earth's upper atmosphere and on other planets. As one approach, it planned to develop an instrument that would contain all the essentials of the firefly's chemistry except ATP, which is produced by all living things on earth. If the instrument encountered earthlike life, the ATP present would trigger the firefly's light-producing system. The resulting glow could be detected by a photoelectric device and then the information would be radioed back to earth, indicating the presence of life, as well as the amount. The instrument was to be automatic so it could be used on an unmanned spacecraft.

Though promising, the instrument soon fell victim to recent NASA budget cuts. Rather than waste a good idea, NASA sought other applications and turned to the urine test. Urinary tract infections rank second in number only to respiratory infections in the United States, making urinalysis one of the most commonly

Studies of artificial luminescence have shed light on bioluminescence: here, sodium hydroxide pellets in a flask of luminol.

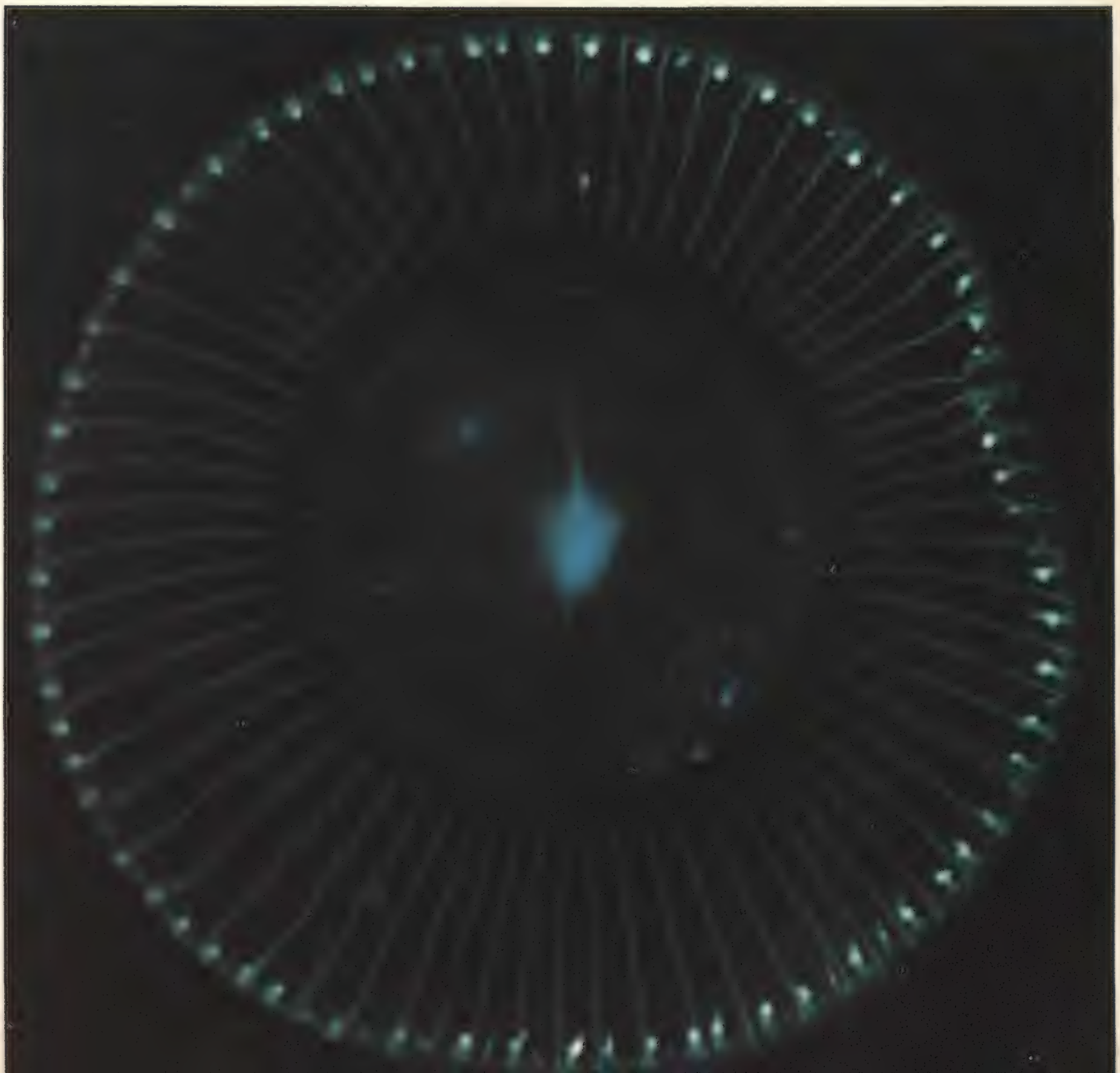


performed tests in most clinical laboratories here.

In the NASA instrument, a series of chemicals is added to a urine sample to destroy ATP in any blood cells, without affecting the bacteria which may be present. This is followed by addition of another series of chemicals, including both the synthetic firefly chemical and the luciferase extracted from the firefly tail lamp. Any light produced indicates the presence and quantity of bacteria which, under these conditions, are the only source of ATP. The NASA instrument has been automated and can analyze a urine sample in half an hour, in contrast to the present method, which requires a day or two to detect the growth of bacteria. In tests at Johns Hopkins Hospital, the instrument detected every urine sample that contained a significant number of bacteria.

So, rather than detecting extraterrestrial life, the firefly's chemical is helping to save human lives, and it is entirely probable that a variety of other practical benefits will derive from living light. But even with its chemistry understood in detail, even with its biological functions determined, bioluminescence will also retain its ancient and valuable role—the creation of wonder and delight.

So plentiful in Friday Harbor, Washington,
that it clogs salmon nets, the jellyfish
Aequorea may yet prove useful to the Navy.



Beads fashioned into bouquets

The use of beads may be older than civilization. But fashioning beads into flowers is a relatively new decorative art, only a few centuries old. It is said that the peasants of France, who made glass beads to be embroidered on the ball gowns of the French court, kept the imperfect rejects and turned them into flowers for church processions and funeral wreaths.

Recently this craft has become popular again and the flowers are being used in bouquets, on napkin rings, placecard holders and as permanent corsages. Flowers and leaves are made by stringing small beads on fine wire and twisting it into variations of a continuous loop. In three one-day classes, Smithsonian Associates learned the techniques of this craft from Helen Liebman.

After stringing beads, Smithsonian Resident Associates learn to assemble flowers.

Eggcup vases (above) hold similar bouquets in varied colors made by class members.

More than a million beads went into the potpourri of bead flowers—all made by Helen Liebman.

In England, ladybirds (ladybugs to you) are facing a severe housing shortage.

Drawings by Colin King

By James Hicks

Save ladybirds, bring back yellow weaselsnouts!

If it moves or if it has leaves, chances are that an Englishman—singly or in a group—is trying to save it

"What," I asked my English wife, "is a ladybird?" Having lived in England only six years, I naturally still need help translating *The Times* of London.

"Small orange thing with black spots," she said. "You know, 'Ladybird, ladybird, fly away home. . . .' "

"Oh! A lady*bug*," I said, "Can you believe that a Mr. Lawrence Hills writes to *The Times* this morning to say that Britain's ladybugs face a housing shortage? It must be a joke. He says because of a plague of the cabbage aphid, which ladybugs eat. . . ."

"Ladybirds."

". . . ladybirds eat, there is a ladybird population explosion. As they kill garden pests without harmful insecticides, he wants to help them get through the winter. He asks people to write in about what their ladybirds do in the winter, so he can design ladybird nests. 'Full details will be appreciated including spot number and whether the same species returns each year to the same accommodation.' Now that has to be a put-on."

"The editor of *The Times*," she said, "does not publish put-ons."

A few mornings later, the subject came up again. "Here's a woman getting in on the joke," I crowed. "She writes, 'My ladybirds seem to have a happy time hibernating in the cracks of the woodwork and other warm undusted corners of this historic house.' You English really have a sense of humor."

"Who's it from?"

"A Mrs. Stopford at Fulham Palace."

"That happens to be the wife of the Bishop of London."

"So?"

"So the Mrs. Bishop of London would not admit to the palace being undusted for the sake of a joke."

The next day another ladybug letter appeared. This man had found millions of ladybirds sleeping under chunks of lava 5,000 feet up Mount Etna and he inferred that small piles of furnace cinders might be just the thing for the ladybug's accommodation problem. I decided to look up Mr. Lawrence Hills. I had to meet a man who could stir up a famous newspaper, volcano-climbers, and women who live in palaces on the subject of what ladybugs do in winter.

I found him in an Essex garden an hour from London—a small, intense, bright-eyed, elderly English gentleman. The sign said "Henry Doubleday Research Association Trial Ground," which may sound like a lot of name for two acres and a few sheds, but when you learn the association is made up of 2,000 English gardening enthusiasts, you don't laugh. The English are very serious about gardening.

Besides, what this organization does is not funny, as Hills, who abhors wasting time, began telling me before I was through the gate. "We're a charity. We give away knowledge, not money. We haven't got any money. You can't patent a ladybird. We want to improve food production and save the environment. Everybody's frightened now. Well, we've been on this since 1954. Longer than anybody. We look for things nobody has looked for before."

We now stood before a small shed. "Here's our ladybird house. From that letter in *The Times* I've had

Formerly a Life *reporter and then chief of that magazine's London bureau, James Hicks is working on his second novel in the U.K.*

Letter writers vie with each other to report to *The Times* the latest swallow, and the earliest cuckoo, or a rare species in Hyde Park.

about 90 replies. Now I'm getting people to send me ladybirds to try some of the suggestions." Send him *live* ladybugs? "They're asleep for the winter now. Just sweep them up in a dustpan, put them in a box, and mail them."

We entered. "What I'm trying to do here is create the ladybird smell. No, *you* can't smell it. Only ladybirds." He tugged at a hanging piece of burlap "They're said to hibernate on cloth. This duplicates peoples' curtains. Then we have these boards. They like to sleep between planks of wood. Now this is asbestos pipe. Have a look up inside there. They like pipes, and the asbestos gives them a surface to cling to. Can't you see them? Is it too dark?" It was too dark.

We're trying to find out what they like best and get the ladybird smell established. Hope they'll come back and that the protection will keep more alive. It's very much more convenient for a gardener to have ladybirds in his shed than in the spare bedroom. That's where you find them. Places like curtain rods. We had the ex-librarian of Windsor Castle writing to say they crawled in there and slept on books.

"Ladybirds are by no means our only project," he said, as we left the ladybug house. "You've heard of the carrot fly? *Psila rosae?* They use aldrin on it, but this also kills the carrot fly predators, beetles and so forth, and develops an aldrin-proof carrot fly. Now the growers run from it. They hire a field, turn it over with their machines, grow one carrot crop, then move on to the next place, trying to escape the aldrin-immune carrot fly.

"We think we've got the answer. The carrot fly flies down a row of carrots and lays eggs where he sees a carrot of enough diameter to house the maggots. One of our members thought, 'Suppose I just ridge earth over my carrots like tiny potatoes. The fly won't see enough carrot showing and he'll go lay his eggs somewhere else.' Last year, six of our members tried it in their gardens and it worked. Next year, I'm going to have a hundred people on this one. Then the carrot-growers will pay attention." If the answer to the carrot fly was so simple, why had not agricultural researchers found it? Could there be some drawback?

"No more trouble to ridge than to spray. Costs less. Doesn't reduce the yield. Nearly all your research is done by chemical firms or universities which have grants from chemical firms. You can't patent this method. No profit in it. So nobody's tried it."

Hill contends that governments and research institutions are not looking hard enough for biological alternatives to pesticides, and believes that his army of amateurs—he's the director-secretary—may find some of the answers in their own vegetable beds.

Projects which would give pause to a think-tank awash in Ph.D.s and money fail to daunt the Henry

Doubleday Research Association. (The name, by the way, is from a 19th-century farmer who introduced into England a plant he called "Russian Comfrey," which, Hill says, could not only help solve the world's food problem but is therapeutic for skin diseases.)

One member, he says, developed an effective, organic substitute for DDT—made from garlic. "His only problem is trying to make it sniffless. Can't get the stink out. Think of squirting garlic around your house. He wants to get this one passed over to the big boys. Says he can't possibly handle it himself."

On the train back to London, I tried to visualize 2,000 men and women building houses for bugs, to see if it would make me laugh. It didn't. I don't know how many ladybugs they will save, or whether ladybugs can save the rest of us from poisoning, but it seems to me if you have that many people busily arranging winter quarters for a helpful insect, you have hope. And ladybug-savers are only a sample of what Britain offers in this line. Back in the days when "environment" was a word confined to discussions of juvenile delinquency, we called them nature nuts. An American newspaper had to have its daily nature-nut story from England—"to brighten up the front page," the editor would say. The English haven't changed, but it's harder to laugh now.

It is all part of the English national character. They seem to be as interested in the other species with which we share living space—plant or animal—as they are in our own. Sometimes, of course, it is carried far enough to irritate even other Englishmen. An angry man wrote to *The Times* recently, complaining that a woman on a crowded train refused to remove her dog from a seat to make room for a human. When challenged, she showed the dog's ticket. But on the whole, it seems an admirable quality, one which might bear emulation in other parts of the world.

Dear sir: The trees are beautiful

Appropriately, *The Times* of London chronicles and reflects this deep-felt English interest in the natural. Letter writers vie with each other to report the latest swallow seen in the Autumn, the earliest cuckoo heard in the Spring, or a rare bird observed in Hyde Park—although in the latter category, there is professional competition from the Ministry of Public Buildings and Works (who, incidentally, declared 1970 a record year for that city-surrounded haven, with 89 different kinds of wild birds officially observed by October).

On the day this is written, the editor gives space to a man who wants to say that the trees are looking exceptionally beautiful in Hampshire. That's all.

The deep-felt interest in the well-being of other creatures may be related to the fact that so many city-dwelling Englishmen, despite the dense population of this island, manage to keep one foot and about three-quarters of the heart in the countryside. It was once my great pleasure to have known an English couple who epitomized this way of living. Both were successful editors in important London publishing houses, but all week long they itched for the dash to their Buckinghamshire cottage and two days with their country, non-human friends.

"We're worried about Harry," Mona said one Spring. "He hasn't shown up this year." Harry, her co-workers knew, was a hedgehog, but the name was not an indulgence in saccharin anthropomorphising. Mona possessed an immense amount of dignity herself, and would never deny an animal his. It was simply convenient to have a name for an individual she knew well.

They arrived late at night at the cottage. Her hus-

If ignored, Albert and Victoria (the swans) marched demandingly through the daffodils.

band Max would immediately search the grounds by flashlight for Harry, and Mona would acknowledge to the office the following week that the hedgehog had not been found. She feared that civilization, probably in the form of a speeding automobile, had caught up with him, and she cared. It was not surprising that when she arrived one work-week smiling and light of step, her colleagues guessed why: Harry has been seen. "Still sleeping away in the bushes," she said, as if she had never worried. "The lazy brute."

Max and she would sit for hours on the bank of a stream behind their house, peering through binoculars at the antics of Wally, the resident water rat. If they failed to walk down to feed Albert and Victoria, that pair of majestic swans would march up to the cottage door and demand service, ungratefully trampling Mona's daffodils en route. They learned to distinguish different birds by their calls, and knew whether one was whistling up a mate, raising an alarm, or simply making conversation. When house martins nested under the eaves of the coal shed, Mona and Max stopped using the coal for fear of disturbing them, and had a new load dumped in the garage. Only once were they known to get cross with one of their companions; Sammy, a stoat, fell into disfavor when he bit the tail off a blue titmouse.

They shared their little piece of country with their friends for more than 20 years before Mona died. Max faithfully continued the weekend treks for another year alone, and then followed her. I sometimes wonder now if the new owners of the place are puzzled by swans that keep trampling down the daffodils, or if they, too, understand about sharing life with other species.

For an Englishman worth his natural heritage, writing letters to newspapers on behalf of mute animals and plants is not enough. Consider the case of Hampstead Heath and Geoffrey Gilbert. The heath is a park, a vast tract of countryside saved by thoughtful English nature lovers of years past from the sprawling growth of London, which now surrounds it. Most urban residents anywhere in the world would be grateful for Hampstead Heath as it is: a preserve of woods, ponds and grassy hillsides where a man can still lose himself and possibly find his sanity without leaving the city.

"That's how I saw it when I first came to London," said Mr. Gilbert, a naturalist who lives nearby. "But I began to feel something was missing. There were trees and grass, but it was incomplete. Finally it dawned on me: Where were the wildflowers?"

Gilbert knows about wildflowers, having 900 carefully studied varieties in his own crowded London garden. Research revealed that, in centuries past, the heath was thick with blossoms and convinced him they did not disappear simply because more and more people strolled there. "The chief culprit," said Gilbert, "is the tradition of Capability Brown, the immortal

Challenged on a crowded train, the lady cheerfully produced her dog's ticket.

English landscape artist. All trees and grass. It's nice but it isn't natural. Then, too, some of the protective measures caused harm. If trees are never cut the bluebells get shaded out."

Armed with color photographs comparing the barrenness of Hampstead Health to lushly flowered rural settings, Gilbert set about bringing back the buttercup—and the dog rose, shining cranesbill, lady's mantle, greater and lesser celandine, hound's tooth, yellow weaselsnout and corn bluebottle, to name a few. Working from his study, where a dried, six-foot stalk of giant hogweed dominates the decor and a Venus flytrap sits digesting insects on his desk, he put the case for wildflowers to local clubs, the press, famous people who might help, and the parks department of the Greater London Council.

"It wasn't easy. Conservation groups were not interested because they want to keep things as they are, and

To save a footpath, the builder had to put stiles over the garden walls of his row houses.

I wanted to make repairs." There were special objections. One woman called the scheme selfish because it would raise the pollen count. Another feared town-bred dogs might eat the flowers and be poisoned.

"Curiously enough," Gilbert said, smiling through his bushy gray beard, "the strongest opposition came from botanists. One wrote me he would never have pleasure finding a rare specimen if he thought it had been planted by man. And they have these catalogs of wild plants in the London area. This will put them out-of-date. As you can imagine, they were furious!"

With a wily sense of public relations, Gilbert pressed on. About 70 years ago the last nightingales disappeared from the heath, abandoning the grove near the house where Keats conceived his ode to them. When Gilbert learned some well-known residents of the neighborhood, including Yehudi Menuhin and Sir Julian Huxley, mourned as much for the absent birds as for absent flowers, he added "bring back the nightingale" to his slogans. This created more headlines and wider support—and, inevitably, a letter from a lady who said she would not sleep at night thinking of "those poor little birds caroling in the cold bushes."

His masterstroke was in answer to citizens who feared parts of the heath would be fenced to protect the flowers. "Sane picking doesn't harm flowers," he assured them. "I like to see children with an armful of buttercups." That did it. The parks department soon accepted the plan, but not before some London teen-agers had answered the call and began sowing the heath with foxglove seed. Wildflowers—and nightingales, imported from the continent and thus rescued from vulgar Frenchmen who eat nightingale tongues—are being reinstated on Hampstead Heath.

Gilbert is delighted. "People keep telling me we can't put the clock back, but I suspect clocks and plants do not follow the same laws. Botanists say we

If nightingales returned to the Heath, a lady worried, wouldn't it be too cold for them?

Save the ladybird et al

should not interfere with nature. Who interfered in the first place? Why shouldn't we help? It is not beyond the wit of man to plant a few buttercups."

If one English nature lover is so formidable a force, how much more irrepressible are 50,000 united in common cause? Any British landowner who tries to close off a public footpath knows the answer. These ancient rights-of-way enable today's Englishman to abandon his car and ramble through what the industrial era has left of his green and pleasant land. To the farmer, footpaths can be a bigger nuisance than even the dreaded cabbage aphid. It's hard to grow spinach with people stepping on it. He is tempted to plow up a footpath, put a fence across the end of it and hope people will forget it was ever there.

But 50,000 members of the nation's ramblers' clubs do not forget. They go to great lengths to protect their right to walk in the countryside they love. When some farmers in the East Riding of Yorkshire tried to keep them out, 300 ardent preservationists trampled five miles across newly plowed fields and cut five fences under the watchful eyes of policemen who were there to protect the walkers, not the fences.

In Essex, they compelled a builder to put stiles over the garden walls of a row of new houses, because an old—but still used—footpath wended that way. They induced the government to mark out ten long-distance walks for which new rights-of-way had to be acquired, one of them 250 miles long. They don't always win. Parliament refused their request to stop bulls from grazing in fields crossed by footpaths, accepting the farmers' argument that a bull will not bother pedestrians if he has enough cows to keep him occupied. In England, even a bull has his natural rights.

Save the ladybug, save the wildflower, save the footpath. The English are big on saving things, especially living things. If it has leaves or moves, chances are an Englishman, or group of them, is trying to save it. A desperately serious and important attempt is now underway to save Britain's hedgerows. Farmers feel they can do without the hedges, but conservationists know that wildlife cannot. A man who believes popular new hybrid roses are crowding out the traditional Victorian and Edwardian varieties has sounded the call for a national organization to save the rose.

For all their good intentions, the English do make mistakes, as a tiny house martin, named Bonzo by his would-be saviors, learned last fall—too late. Mauled by a cat in Somerset, he missed the migration of his fellow swallows to Africa, where they winter. The Royal Society for the Prevention of Cruelty to Animals nursed him back to health and arranged for BOAC to fly him to Nigeria in a VC 10. A bird taking a luxury flight in a rubber-lined cage naturally captured Fleet Street's attention, probably not to the surprise of BOAC, so Bonzo was presented at a press conference on the day of departure. For a last picture, the photographers pleaded, let him *out* of the cage.

Alas, Marshall McLuhan, it is true: the media shape the event. The cage was opened, Bonzo blinked at the strobe flashes, and then, madly beating his little wings, took flight for what looked to him like freedom, but which was, in fact, a plate glass window. Bonzo broke his neck, but it is possible that BOAC and the RSPCA are now suffering more than he did.

The great English froglift

This year they are saving the frog. Britain's frog population is in decline, thanks to polluted spawning grounds and new highways which cut them off from their home ponds.

It bodes well for the nation's future that the frog-savers are schoolchildren. Organized by the Wildlife Youth Service, 300,000 of them are participating in the Great Froglift, collecting the jelly-like frogs' eggs from polluted ponds and those too near roads, and transporting them in plastic bags to safer areas. *The Times* can also take heart. If that many youngsters want to slush out and move frogs' eggs around, the editor 20 years hence need fear no shortage of letter writers, nor of readers who can understand articles like one which muddled me the other day.

A doctor, it said, "tells of a Camberwell beauty in a Kensington square and a painted lady in Lambeth." In permissive London that is not news, but I read on. "The Camberwell beauty does not breed in Britain, but is occasionally found in London, probably as an immigrant from Scandinavia." I was telling my wife, that's not what I hear about Swedish girls, when she explained that the subject was butterflies. Sometimes I wish she wouldn't translate for me.

A ladybird on a daisy, fitting symbol for
an admirable quality of the English character.

By Elizabeth Barlow

A mini-city buds on New York's island of despair

A humane urban town will arise on a stony splinter of land called Welfare Island, long the last resort for the city's wretched.

They named it Welfare back in 1921 to erase its notoriety, the island called Blackwell's, whose Black Maria had once trundled New York City's insane, indigent, outlawed and outcast to a ferry landing for the trip to those austere institutions: the asylum, almshouse, workhouse and penitentiary. Welfare Island is a stony bar two miles long and 800 feet wide between Manhattan and Queens bisecting the East River into a pair of channels.

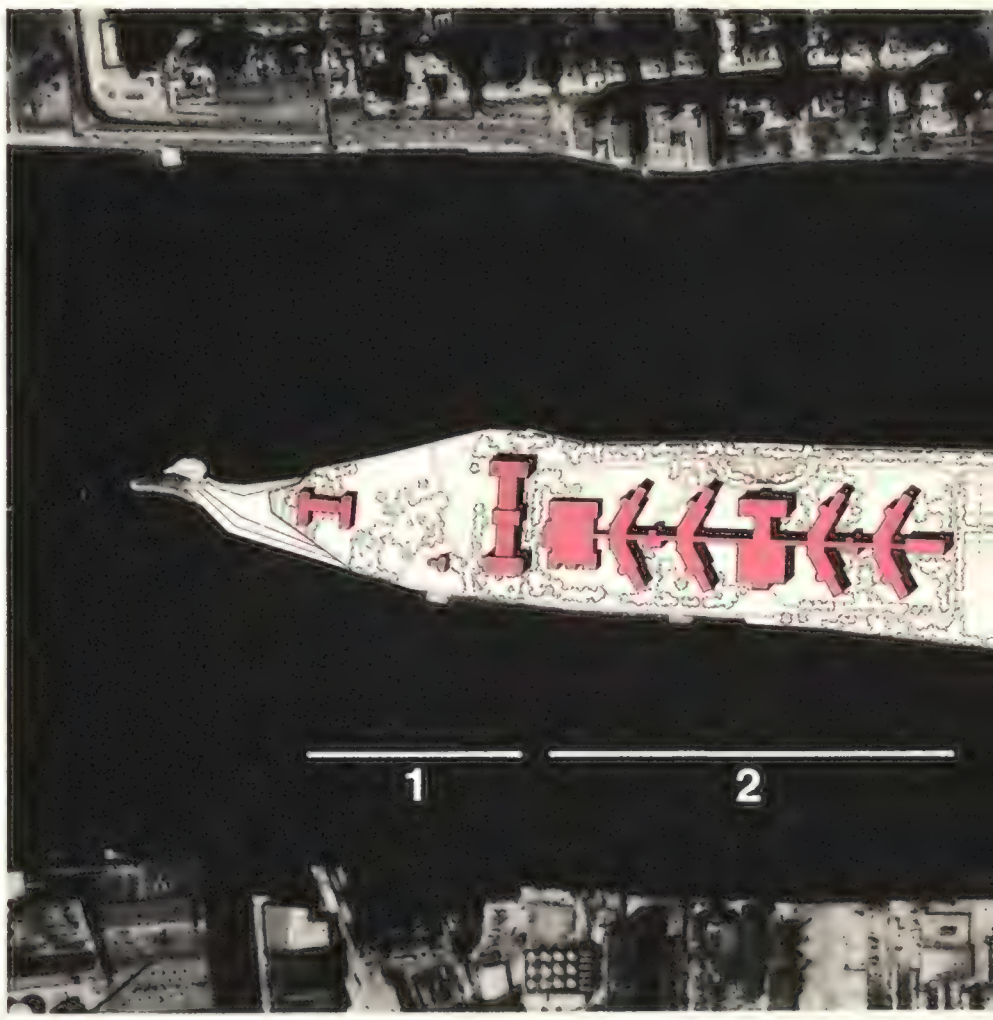
Now with its decayed weed-encroached buildings, it exudes a ghostlike quality. But alongside the relics of the past, future-shaping forces are at work. An army of hard hats occupies the island. One battalion is boring a large distribution station for a new city water tunnel, another is digging a subway tube that will plug the island into the rest of New York City.

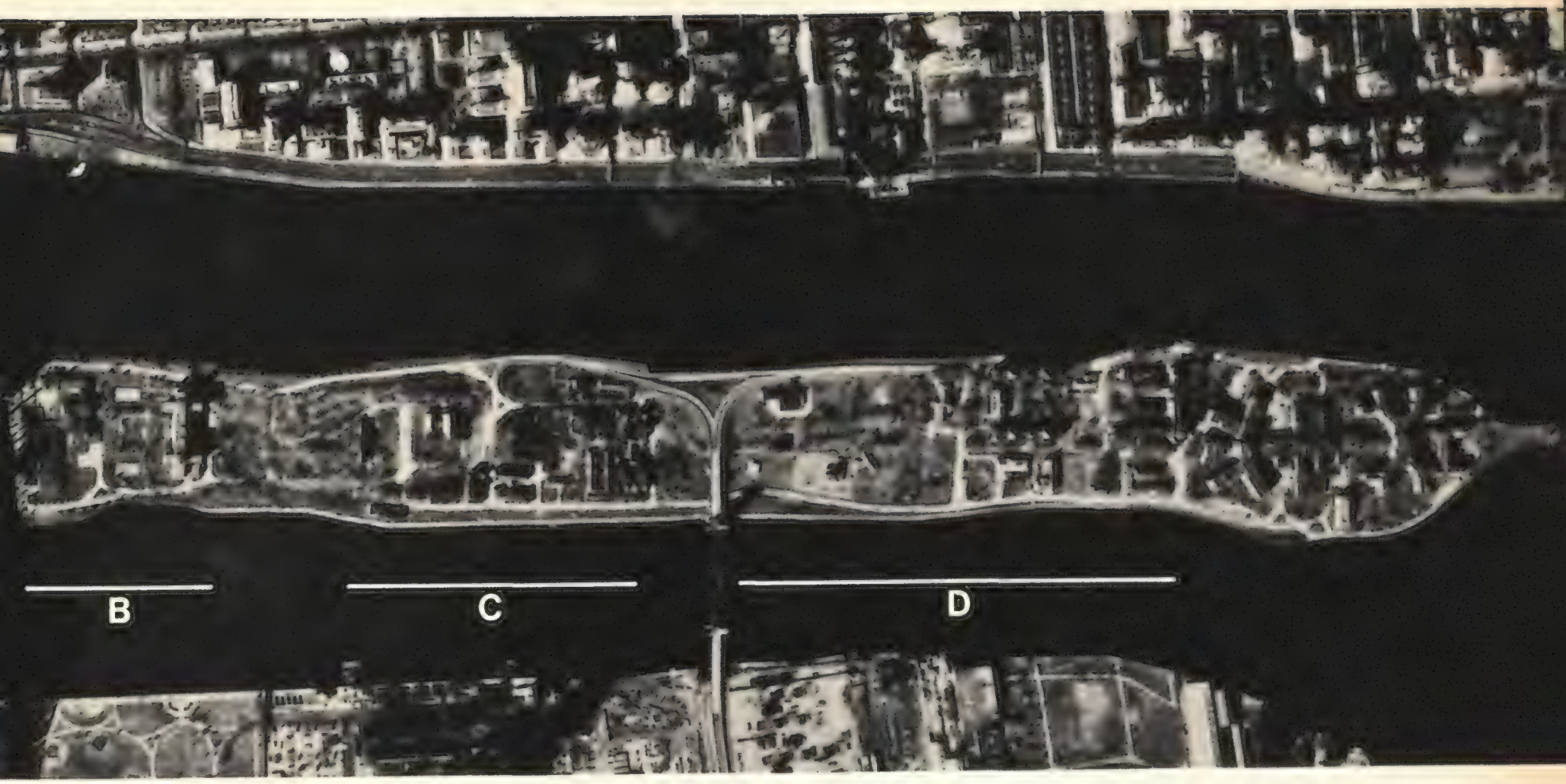
The wings of the old lunatic asylum have been amputated, leaving its beautiful domed central octagon prominently silhouetted against the sky. A flat, brick-scattered plain marks the site of the old almshouse; an occasional weather-beaten wheelchair lies rusting on the premises, a souvenir of its past as a place of last resort for the aged and disabled.

For several months the demolition men have been preparing the ground upon which planners and build-

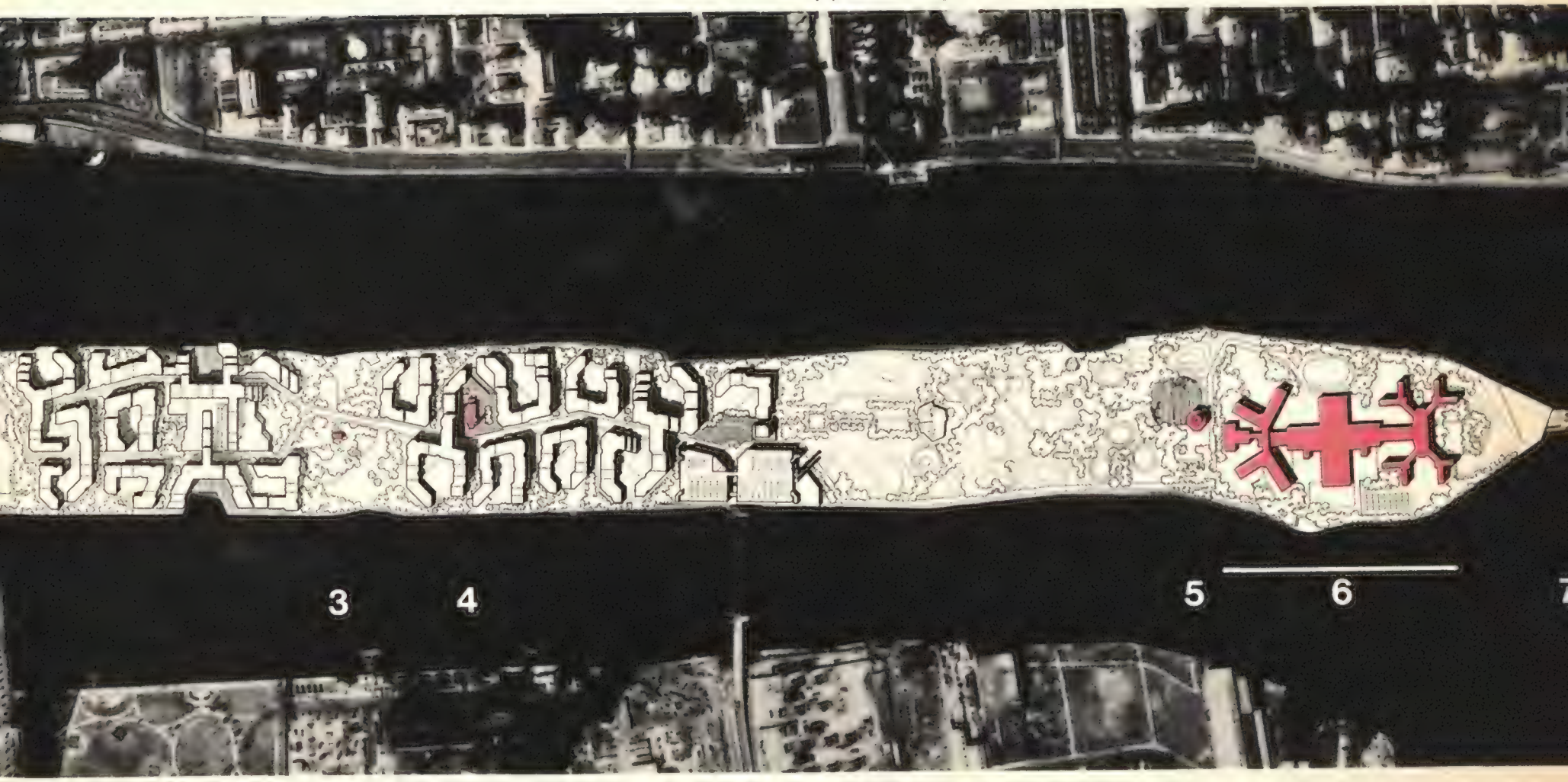
An avid explorer of the natural world and its connection with urban man, Mrs. Barlow wrote the forthcoming book, Forests and Wetlands of New York, *from which her article is adapted.*

Like a battleship lying between Manhattan (above) and Queens, Welfare Island is being taken out of mothballs by the state's Urban Development Corporation. Most of the old medical buildings are being razed (A through D) to make way for five parks and two connecting residential areas.





In addition to two hospitals (2,6) the U.D.C. plan retains certain historic buildings sprinkled through the parks and town areas: three defunct medical buildings (1), an 18th-century mansion (3), a Victorian chapel (4) , part of the lunatic asylum (5), and a lighthouse (7) of the Civil War era.



A mini-city buds in New York

ers, operating under the direction of Edward Logue's New York State Urban Development Corporation, will create a new landscape, a new town called Island Town. The debris-strewn island is also the slate upon which plans are being drawn for five new parks, the largest of which is to be a 25-acre ecological park operated by the State Park Commission for New York City.

The overall plan for Welfare Island was drawn up by Philip Johnson and John Burgee and offered to the city in October 1969. Several well-known architectural and landscape architectural firms are now participating in the design of the plan's various components. Funds will be drawn from a variety of government housing subsidy programs to provide 5,000 apartments for people whose incomes range from the poverty level to that of the affluent.

Private automobiles entering the island will be funneled into a giant garage; circulation around the island will be by mini-transit, or on foot. A continuous promenade will rim the waterfront. The now-decrepit Blackwell house, one of the last remaining specimens of 18th-century architecture in New York City, will be restored as the focal point of a park separating the new town's two high-density development clusters. The island's two functioning hospitals will remain. Basically, then, the Welfare Island of the future will consist of activity nodes—its present medical institutions and new housing, shopping and entertainment complexes that are lively and intensely urban—interspersed with quiet zones for recreation and relaxation.

The ecological park, called Octagon Park after its principal landmark feature, is expected to create certain kinds of environmental awareness. In his design of the park the architect, Dan Kiley, wants to articulate certain timeless relationships between human beings and their environment. He is interested in the ways in which man has measured and ordered nature, in his methods of comprehending and defining such things as gravity, air, light, water. He would like to create a kind of outdoor architecture that will help explain these elemental and universal forces that shape and govern human life. One proposal Kiley makes is a "geology eco-center"—an amphitheater-like bowl bored out of the island's bedrock. Tiered seats on one side would face a cascading sheet of water; a shaft positioned in the center of the bowl would act as a giant sundial marking the hours and the shifting direction of light throughout the day.

The first stage of building—the construction of 3,000 apartments in what is to be called North Town—is scheduled for completion in the fall of 1973, according to U.D.C. officials. The remaining 2,000 units plus a hotel are to be finished in 1976 or 1977.

Implicit in the overall plan is a sense of romance, and, if anything, Welfare Island is romantic: romantic in its insularity, a river-bound sliver in the heart of a great city, like the Ile de la Cité in Paris; romantic in its almost postcard panorama of the Manhattan skyline; romantic in the brutalistic sense, in its views of the overpowering industrial scenery of Queens, and the great girders and trusses of the Queensboro Bridge soaring overhead. But Welfare Island's romance is more than topographical; it is historical, too.

The island of exile

Even from the beginning of colonial times the island was a place of exile. Bought in 1637 from the Indians by the Dutch governor Wouter Van Twiller for a country estate, it was transferred to the British crown in 1664 and in 1668 was bought by Captain John Manning, then Sheriff of New York. Manning fell into disgrace when, acting as commander of the fort during the absence of Governor Lovelace in 1673, he hastily surrendered to the Dutch who had staged a naval assault to regain control of their old colony. Manning's incensed fellow townsmen charged treason. Although he made a pilgrimage to England to explain his actions to King Charles II, who exonerated him, the citizens nonetheless court-martialed him upon his return, and, finding him guilty, banished him to his island. His banishment, like that of Boss Tweed who also paid his dues on the island for besmirching the city's honor two centuries later, was not entirely painful. Manning lived in a fine mansion dubbed "The Castle" and entertained his visitors with bowls of rum punch.

The site of his castle at the island's southern end, looking out toward what is now the U.N., later became Tweed's home when he was incarcerated in the city penitentiary in 1871. Designed in part by James Renwick, architect of the Smithsonian Institution, with a nostalgic eye toward medieval dungeons, the

penitentiary also was like a castle with rounded turrets and a roof profile of notched battlements. Tweed supposedly had a large window cut into one wall so that he could better view the city he had swindled.

Robert Blackwell, whose name became attached to the island, was married to Manning's step-daughter and heir and their grandson, Jacob Blackwell, was the proprietor during the Revolutionary War when the island figured only marginally in the tumult swirling all around it. British troops, following their victory on Long Island, landed on the island but they were immediately repulsed by rebel cannon shot fired from batteries located on Manhattan.

The little city that shocked Dickens

In 1828, the city purchased the island and before long the old quarries were being worked by convict labor. Soon the banded gray gneiss of the island was transformed into what one 19th-century newspaper account characterized as "a little city on the waters . . . a city in which all the misery, despair and viciousness of the metropolis are epitomized."

Charles Dickens, with his penchant for documenting wretchedness, made a point of visiting Blackwell's Island in 1842 during his travels in this country. In his *American Notes* he writes that at the northern end of the island he saw the lunatic asylum where: "The terrible crowd with which these halls and galleries were filled, so shocked me, that I abridged my stay within the shortest limits. . . . The moping idiot, cowering down with long dishevelled hair; the gibbering maniac, with his hideous laugh and pointed finger; the vacant eye, the fierce wild face, the gloomy picking of the hands and lips, and munching of the nails: there they were all, without disguise, in naked ugliness and horror."

The almshouse with its long segregated dormitories and workrooms impressed him "very uncomfortably" while the jail at the island's southern end—that battlemented, turreted fortress where Tweed was later imprisoned—inspired his compassionate ire. To conjure up an adequate impression of the place, he suggests: "Make the rain pour down, outside in torrents. Put the everlasting stove in the midst; hot, and suffocating, and vaporous, as a witch's caldron. Add a collection of gentle odours, such as would arise from a thousand mildewed umbrellas, wet through, and a thousand buck-baskets, full of half-washed linen—and there is the prison as it was that day."

The octagonal rotunda of the lunatic asylum was designed in 1835 in the Greek Revival style and completed in 1839. Admired by Dickens for its "spacious and elegant staircase," it has been praised by the architectural historian Henry Russell Hitchcock as being

Shorn of its wings, the tower of the lunatic asylum will remain and its greatly admired staircase (below) will be restored.

The Blackwell house, one of New York's oldest, will lie between the two new town areas.

"as generous in scale and as interesting for the original sort of handling of space as a Baroque stair hall."

Although Dickens was doubtless rightfully horrified at the conditions assigned to those poor benighted creatures of the pre-psychiatric era, there was an innocent charm at least in their external surroundings. The asylum grounds (site of the new ecological park) were shaded by tall willows, horse-chestnuts and buttonwoods, and they were adorned with an ornamental summerhouse and an ice-skating pond (which also provided block ice for the asylum and the nearby workhouse.) A tree-arched carriage road led to the sail-flecked water. The view to the east was of Ravenswood in Queens, not the Ravenswood of today with Consolidated Edison's three giant smokestacks looming against the sky, but a Ravenswood of "luxuriant foliage and elegant architecture" in the words of a contemporary journalist.

From the opposite side of the island the view of the Manhattan shore with its "noble mansions and their boat-houses" was equally agreeable. Twenty acres of land adjoining the asylum were given over to a

The female almshouse, "a place of comparative comfort," photographed c. 1890, is gone.

Patients in Goldwater Hospital will still enjoy their river view of Manhattan's skyline.

Built perhaps by an asylum inmate, a lighthouse looks darkly toward Hell Gate.

vegetable garden and, in addition, there was an extensive flower garden.

At the far tip of the island where a lighthouse now stands there was a curious structure known as Maxey's Fort. It was built of blocks of clay and grass dug from the marsh behind it. According to accounts of the day it was built soon after the Civil War by a mad Irish Army officer, Thomas Maxey, and mounted with wooden cannon. Maxey, fearing an invasion by rebel privateers, would stand guard each day brandishing a wooden bayonet on a broom handle. He was, in spite of this warrior-like attitude, a gentle person, extremely fond of birds. An elaborate gate decorated the causeway that led over the salt marsh to the Fort; it had two large openings near the top designed by Maxey to accommodate the nests of wild geese. Inscribed upon it were these words:

I invite the fowls
And the birds of the air
To enter

Today the area reserved for Island Town's motorgate or automobile depository, is a desolate, yet strangely beautiful wasteland. A little vine-enshrouded bandstand and a broken flagpole standard bearing a mosaic of Fiorello LaGuardia are the only remains of the almshouse that once occupied this part of the island. Where its collection of ramshackle old buildings have been most recently torn down the ground is sterile, studded with bricks and debris, but where the buildings have been gone for a few years, a luxurious meadow of weeds and wildflowers and saplings has now sprung up.

The blind leading the blind

Originally the city's vagrants and helpless poor were incarcerated with hardened criminals in the Tombs and the penitentiary. The almshouse, which was built shortly after the city acquired the island in 1828, made the situation somewhat more human although the "poverty is a crime" philosophy still prevailed. After 1852, when the workhouse was built, there was discrimination between the aged and disabled, or "almshouse" inmates and the able-bodied indigent who were assigned to the "workhouse."

According to a correspondent, W. H. Davenport, who contributed his impressions of Blackwell's Island to *Harper's Magazine* in 1866, the workhouse was designed by the city commissioners to be "as repulsive as is consistent with humanity" while the almshouse was supposed to be "a place of comparative comfort, liberally though economically maintained." In the beginning a modest stipend was given to workhouse laborers. This was soon dropped, however, as the workhouse became an exclusively penal institution for

minor offenders—persons convicted of small thefts, drunkenness, vagrancy or disorderly conduct.

In 1869 male and female blind asylums were added to the almshouse and its name was changed to the New York City Home for the Aged and Infirm. "The blind leading the blind" became a common and poignant sight as each morning a line of men would form two abreast, arms touching the shoulder in front, to be led to the barber shop.

The ranks of the inmates would swell every year as winter approached and seasonal labor was laid off; no one was ever turned away, and so the home was continually crowded beyond capacity. Things were so bad at the end of the 19th century that people were sleeping two and three to a bed as well as on the floors, in an outdoor shed and even in tents. There was in spite of this a serenity and quiet village beauty about the place with its carefully tended flower beds, grassplots and hedges. In 1952 the 124-year history of the Blackwell's Island almshouse came to an end. Its able-bodied inmates were transferred to the Staten Island farm colony, and those that were bedridden were placed in the newly opened Bird S. Coler Hospital.

Both Bird S. Coler at the island's north end and Goldwater at its south end are city-operated hospitals for the chronically ill, mostly aged paralytics. Excluded from normal society by their infirmities, from private nursing homes by their budgets, and in some cases by relatives from their homes, the patients move in wheelchairs up and down hospital corridors and on fine days to the outside where they warm themselves in the sunshine.

These two hospitals, the successors to a number of other now defunct public hospitals on the island, will be retained within the framework of the new town plan. Some of the old hospital structures are being saved as reminders of the island's role as a place of quarantine in those pre-vaccine days when various contagious diseases struck terror into the hearts of city dwellers. So imbued was the island with the atmosphere of disease and death that in the minds of many a trip across the East River was synonymous with a trip across the River Styx. For many others, of course, a trip across the East River meant not a hospital bed but a prison cell, and eventually the island gained much more notoriety from its prison than its hospitals.

Where Goldwater Hospital now stands, within the turreted Victorian fortress of the city penitentiary in which Boss Tweed had served time so comfortably, Mae West was sentenced to spend ten days in 1927 for her "indecent performance" in a play called *Sex*. What galled her most was exchanging her skintight gold gown for a prison-issue dress and the itchy underwear. Captivated, the warden let Miss West wear her own underwear and recalled her as "just a wholesome woman trying to serve ten days."

There were riots at the penitentiary in the 1930s. The worst, that of October 22, 1932, was triggered by a feud between the Italian and Irish gangs who were competing for influence within the prison. But soon after the gangs had not only healed their differences, they were partners in the operation of a vice ring that embraced the entire penitentiary. Joe Rao, a Harlem gangster, bootlegger and racketeer, who had been convicted of extortion in the Bronx soda-water trade, headed the Italian faction. Edward Cleary was the Irish leader. Both lived with their henchmen in different hospital wards in the manner of feudal barons, smoking expensive cigars, wearing silk shirts and underwear and costly dressing gowns.

Their control over the prison was absolute; even the guards assisted in the sale of narcotics to the inmates. Heroin was brought into the prison by carrier pigeon. Cleary maintained his pigeon cote in a hospital room; Rao had a cote built for his birds on the roof of a storehouse. Steaks and other choice foods were stolen from the prison commissary, and the gang lords were served in their rooms by valets.

Like partners in an ingenious syndicate, Rao and Cleary were able to squeeze a profit out of practically every aspect of prison life. The clothes of the new inmates were sold; privileges—easier or potentially more lucrative jobs—were sold. Even the warden's parole list was presented for their approval.

The Little Flower's prison raid

On January 24, 1934, as one of the first acts of his administration, the Little Flower had his newly appointed Commissioner of Corrections, Austin MacCormick, stage an early morning raid on the prison. Rao and Cleary and their henchmen were ousted from

their comfortable hospital dormitories and marched to the most unpleasant cells in the prison. All of the other cells were cleared and their contents thrown into the hallways—paper soaked in a heroin solution, files, razors, pieces of lead pipe, and, from one section of the prison, transvestite trappings—cosmetics, perfume, female underwear and a lady's wig.

The prison's depravity, before rumored but now fully exposed, led to renewed demands that it be replaced by a new prison on Riker's Island. Another victory for the crusading LaGuardia occurred in 1936 when the prisoners were transferred to the new Riker's Island penitentiary, and the infamous old stone fortress on Welfare Island was demolished.

A hot debate soon arose within the city administration over the future use of the old prison site. Typically, Parks Commissioner Robert Moses immediately published plans for a new sports park. Hospitals Commissioner Goldwater argued the case for a new hospital for the chronically ill, and eventually his side prevailed and the hospital that today bears his name was constructed in 1939.

Mixed among the island's penal, medical and charity institutions were several churches which, with the construction of interior chapels in Goldwater and Bird S. Coler hospitals, were allowed to fall into disuse. Scheduled to remain as a landmark in the plan for Island Town is the Chapel of the Good Shepherd, a Victorian Gothic structure designed by Frederick Clark Withers and built in 1889 at a cost of $80,000. The church is maintained by the Episcopal Mission Society, and its basement serves as the home of the Protestant chaplain of Bird S. Coler Hospital. Its fine stone carving and handsome interior woodwork are witness to the 19th-century Christian attitude that, though the indigent should live in harshness and discomfort, they should nonetheless worship in beauty.

Nature and the urban machine

Next to the Chapel of the Good Shepherd a little Lutheran Church that once conducted services in German is crumbling into ruins. Sunlight pours through its broken roof; its floorboards are gradually rotting away, and, standing there, one wonders what would happen if the entire city like this little church were abandoned. Without people transforming, subduing and reconstructing the natural world there would be only nature's own relentless dynamic at work, and soon New York would become some eerily impressive, vegetation-encased North American version of Angkor Wat. Of course this won't happen, at least not yet. But Welfare Island, a part of the city yet removed from it, is a good vantage point for speculating about the relationship between nature and the urban machine.

The Victorian Gothic Chapel of the Good Shepherd will be a landmark amid Island Town's new buildings (see model below).

Book reviews

The Nature of Life
Lorus and Margery Milne
(Crown, $17.50)

The Hidden Sea
Douglas Faulkner and C. Lavett Smith
(Viking, $14.95)

Books that look as if they were intended for coffee-table display must expect to be judged, at least at first, on appearances. They should catch the eye, pique the interest and stimulate enough fascination to make the browser keep on turning pages. Hopefully the browser may become a reader. And that's the point at which, unfortunately, so many coffee-table books become ho-hums. The writing does not fulfill any promises.

The Nature of Life by Lorus and Margery Milne seems to be a coffee-table book which just doesn't make it. The size is right and the jacket holds promise, but once you get inside you find that the color pages, nicely printed in Italy, intrude too rarely into page after page of black-and-white photos. Add the fact that the book is 316 pages long, heavy on text and laid out to look, with the exception of the color pages, like a volume from a set of encyclopedias published 30 years ago, and you probably won't leave it on the table long enough for the first cocktail-glass ring to mar the surface.

Don't bury it on the library shelf just yet, though. Lorus and Margery Milne have been zoologists at the University of New Hampshire for 22 years, they've traveled just about everywhere, and they've written more than 25 books on plant and animal life and the world around us.

The task they've set for themselves is a formidable one, for *The Nature of Life* begins at the beginning: It tries to describe the many ways in which life was formed, how it spread around the earth and how it developed over the millennia. To do this, the Milnes take on the flora and fauna of the globe in environmental segments—Old and New World tropics, North Pole, middle latitudes of Eurasia and North America, the islands, the open sea, coastal waters, brackish and fresh waters. That's a lot of nature and a lot of life; the subject may need the elbowroom of an encyclopedia.

Within this limitation, however, the text offers a generous portion of meat and potatoes. It describes the world's largest flower—the Sumatran *Rafflesia arnoldi,* 20 pounds of blossoms with a 37-inch diameter—and the amazing Nullarbor (no trees) Plain of Australia, "where a level layer of porous limestone 900-feet thick prevents the growth of trees by letting [rainwater] percolate downward quickly beyond reach of roots."

They also introduce us to a super-bestiary of oddities: pigeons that can "disengage the elastic sockets of their jaws (much as many snakes can) to swallow whole fruits that are larger than their heads"; a tiny South American freshwater fish called candiru that lives as a parasite on the gills of larger fish and "shows an unexplained readiness to swim to and squeeze itself into the urethra of a man or woman bathing in the water, causing excruciating pain and necessitating expert surgery for removal"; and the astonishing spread of the cultured primate, Man, and what he has done to the world he set out to master.

In *The Hidden Sea,* Douglas Faulkner and C. Lavett Smith have balanced themselves in the middle of the coffee table. Faulkner's underwater photographs are so superb that it's difficult at first to believe they weren't staged in an aquarium somewhere. The authors apparently feared this reaction, for in the first paragraph they take pains to inform us that each picture "shows the animal alive and in its natural setting." And at the back of the book, in a section called "Notes," Faulkner provides vital statistics for each photograph: identification, comparison to life size, when, where and at what depth taken. (The Notes also contain captions for the pictures, an unfortunate placement for readers who resent having to flip back and forth.

There are 70 exquisitely printed (in Switzerland) full and double page pictures in the book, which means that quite a few of the almost infinite variety of sea creatures are missing. But those represented — sponges, mollusks, corals, jellyfish, scorpion fish and the like—come across more vividly on the printed page than in their habitat, unless the diver happens to have with him a light as brilliant as Faulkner's underwater flashgun.

The pictures help, too, by freezing action that might be missed by a swimming observer, who has to look out for a lot of things. One, for example, shows a "waiting room" scene with several dozen goatfish lining up for a cleaner wrasse to go over them for parasites. Only one of the goatfish—the one being cleaned—has extended its barbels and erected its fins, the signal that it is ready for treatment.

The writing in *The Hidden Sea* is not what you would call lively, but it has its qualities, interesting information and brevity. Dr. Smith, who, as associate curator of Ichthyology at the American Museum of Natural History, obviously could go on about sea life at some length, has sensibly kept his chapters short, packed with facts and spiked with enough juicy eyebrow-raisers to make the browser-turned-reader thirst for more.
—James A. Cox

The Hollow
Bill Surface
(Coward McCann, $5.95)

Deep in another world, surrounded by breathtaking mountain scenery, are "eight small houses in a nameless, twisting hollow." Girded against the winds by tarpaper strips, they huddle into

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Picture Credits

Cover Gjon Mili; 8, 9 sketch by Grady Larkins, McCarter theater; 10 Albert Fenn, sketch by James Edmund Brady, McCarter theater; 13 Gjon Mili, sketch by James Edmund Brady, McCarter theater; 14, 15 Gjon Mili; 16 sketches by Grady Larkins, McCarter theater; 18, 19 Historical Museum, Bern; 20-24 Constance Warner; 25 Charles Phillips; 28-30 Matt Spiro, New York State Historical Association; 31-33, 35 Paulus Leeser; 38, 40, 41 William Vandivert; 42, 43 Yata Haneda courtesy of Dr. William D. McElroy; 44 Dr. Emil H. White; 45 Dr. O. Shimomura; 46, 47 Charles Phillips; 48, 50-53 drawings by Colin King; 55 Francis M. Greenwell; 56, 57, 59, 60 top Urban Development Corporation; 60 bottom Jacob A. Riis, Jacob A. Riis Collection, Museum of the City of New York; 61, 63 top Urban Development Corporation; 63 bottom Louis Checkman; 66 Bruce Davidson; 68 John Bryson; 70, 71 National Earthquake Information Center, National Oceanic and Atmospheric Administration; 72 John Bryson; 73 drawing by Arnold Roth

Bay skipjack, one of our last working sailboats, rolls home laden with "arsters."

The Oystermen of the Chesapeake
Robert de Gast
(International Marine, $16)

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the sides of steep ridges and on the edges of streams now choked by old washing machines, pop bottles and rubber tires.

Inside one such house a family eats the end-of-the-month supply of pinto beans, potatoes and cornbread, waiting for "check day" and their next book of food stamps. They do not feel sorry for themselves, nor do they consider themselves poor. There is always someone worse off.

This is Appalachia where more than half a billion dollars in federal-state aid has been poured since 1965. Describing his "hollow" in eastern Kentucky's mountains, the author asks whether its people have been "shamelessly forgotten, or have a meaningful number of lives been upgraded?"

For five days, Bill Surface lived with the family of Coy and June. He notes that though their income, like most, has been increased by the poverty programs, there is a lack of true change. Money now spent in the area "has fostered dependency on government checks instead of inspiring people to uplift themselves."

Coy, except for working on a government project for a year, has never held a job for four months since marrying. The project offered him a chance to move to southern Illinois as an assistant carpenter in a mine. Like many mountain people, he was unable to pull himself up by the roots.

He gravitated toward a check from a government agency rather than scrape for a job with a mill or mine uncertain of its future—and which would pay less.

Coy is not alone. In Harlan County, Surface says, "14,575 of its 37,000 inhabitants live on checks from the Social Security Administration or the state welfare office and 9,000 subsist on various other types of assistance."

Coy and his stepson used to dig for herbs and roots to sell for food stamps to feed the family of 10 children. But, waiting in line one day, he saw that a number of people who said they couldn't pay for their stamps were given money from an emergency fund. Now he seeks and gets such aid.

When a few one and two room schoolhouses were built in this area in the '20s, "most families could not comprehend how walking several miles along creek beds to learn to read could help them hunt, plow, hoe, cut firewood or obtain provisions."

That attitude persists. In most mountain families there is an inability to grasp the significance between literacy and a family's plight. As a Floyd County School superintendent points out, "You can't sell schooling very easily to parents who don't think it's worth as much as a hundred-dollar car."

The mountaineers are too gentle to force their children to go to school, so let them stay home on the slightest pretext. Officials trudge tirelessly after them. Schools lose funds if a certain percentage of pupils don't show up.

Government programs which followed when mining played out were administered by a few ruling families, and the purpose of the funds was inhibited. The poor view these rich as "people who can take care of you."

They cannot believe that fellow Kentuckians would harm them. When a son pointed out discrepancies between the grocery bill and the amount of food his mother got, she was adamant in her disbelief: "Shoot, Melvin don't never double charge me." In the same vein, since Medicaid, a number of area doctors have been able to build big ranch houses and buy new cars. Said one resident about federal-state assistance, "Yeah, poverty stuff is real good for our part of the country. Some of it's even goin' right where it's 'posed to."

The overall programs intended to change mountaineer lives "are hauntingly reminiscent," says Surface, "of foreign aid programs that help more people in palaces than in backward provinces."

Surface writes with insight and transmits a deep understanding of mountain folk. One criticism: He delays too long his chapter on the region's history. It gives valuable depth in realizing the forces behind these isolated lives.
—Jane Hoyt

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(signed) Joseph J. Bonsignore
General Manager

Smithsonian highlights

Portrait from "East 100th Street," taken by Bruce Davidson.

Arts and Industries Building

"East 100th Street" is an exhibition of 80 photographs by Bruce Davidson, taken over a two-year period on a single block of East Harlem. Using a huge four-by-five view-camera on a metal tripod, Davidson entered the homes and lives of the East 100th Street community (right).

"Aerial Exploration" displays two famous aircraft used in exploratory ventures. The *Sirius* flown by Charles Lindbergh and his wife "North to the Orient" and the *Gamma* flown by Lincoln Ellsworth and H. Hollick-Kenyon across Antarctica.

"The Hand of Man on America," a photographic documentary by David Plowden of the man-created objects that have helped to shape our country, is here prior to a two-year tour of the country (see article, SMITHSONIAN, January).

"Genteel Female," lithographs from the Smithsonian's Harry T. Peters America on Stone Collection, depicts a romantic view of the American woman of the 19th century—through February 16.

"Space and Artists" consists of 60 paintings inspired by the space effort. The exhibit includes sculpture, impressionistic and abstract paintings and realistic illustrations.

National Collection of Fine Arts

"Thief of Souls," a retrospective exhibition of paintings by Romaine Brooks, includes 30 paintings and 37 drawings. The show will also have photographs of the artist in her studio, her scrapbook and facsimiles of her drawings.

Winslow Homer's paintings from his early period include 51 oils, watercolors, drawings and graphics.

"American Impressionists," a permanent collection of paintings by 10 American artists, shows their reaction to the French Impressionists of the same period.

Prints from the American Pavilion shown at last summer's Venice Biennale (see article SMITHSONIAN, June 1970). Opens February 12.

Museum of Natural History

Bird carvings by John Drake of Carlsbad, New Mexico, are on display in the foyer of the museum. The exhibit includes two passenger pigeons presented to the Smithsonian by the artist with a cardinal, meadowlark and robin on loan.

"Smithsonian Scientists Study the Moon Rocks" includes photographs showing the investigation of the contents of the moon-rock specimens.

Museum of History and Technology

"Do It the Hard Way: Rube Goldberg and Modern Times" is a special exhibition of cartoons, writings, sculpture and inventions (see article, SMITHSONIAN, November 1970).

National Portrait Gallery

"Along This Way," a teaching exhibition on black-culture exponent James Weldon

Johnson (1871-1938), uses portraits, photographs and recordings to tell about the man and his work.

"John Muir (1838-1914)" is a teaching exhibition on the conservation movement in the United States at the turn of the century.

Freer Gallery of Art

An exhibition of Whistler's works includes 40 of his seascapes and landscapes, 26 prints and 16 canceled copper plates.

Division of Performing Arts

February 6: "Music From Marlboro"—chamber music.

(For further information on time and place of program call 202-381-5407.)

Smithsonian Commons

New luncheon facilities are now open exclusively for staff, resident scholars and all members of the Smithsonian Associates. Located near the reception center in the original Smithsonian Building and open weekdays from 11:30 to 2:00 o'clock, the commons offers a complete buffet luncheon for $2 upon presentation of a membership card.

Traveling Exhibition Series

San Diego, California—"Mission Apollo" (California Western University, opening February 20).
Oxford, Mississippi—"Contemporary Art From India and Iran" (Mary Buie Museum, opening February 13).
Bemidji, Minnesota—"Recent British Prints" (Bemidji State College, opening January 30).
Sandusky, Ohio—"Contemporary African Printmakers" (Sandusky Area Cultural Center, opening February 13).
Atlanta, Georgia—"Urban Design: Manhattan" (School of Architecture, Georgia Institute of Technology, opening February 13).
Mankato, Minnesota—"Design and Color in Islamic Architecture" (Mankato State College, Lincoln Art Gallery, opening February 6).
Williamsburg, Virginia—"Mexican Folk Art" (Abby Aldrich Rockefeller Folk Art Museum, opening February 20).
Fort Collins, Colorado — "Dead Sea Scrolls" (Colorado State University Library, opening January 23).
Gainesville, Florida—"Jean Louis Berlandier" (Florida State Museum, University of Florida, opening February 13).
Moscow, Idaho—"Two Greek Photographers" (University of Idaho Museum, opening February 6).
San Antonio, Texas—"Discovering Color in Nature" (Citizens National Bank, opening February 20).
Springfield, Ohio—"Bruegel and His World" (Wittenberg University, opening January 23).

Tours for Associates

The foreign study tours listed below are currently being planned exclusively for members of the Smithsonian Associates. Members wishing further information should write: Smithsonian Reception Center, Great Hall, Smithsonian Building, Washington, D.C. 20560, specifying which tours are of interest.

East African Safari and Indian Ocean Cruise: A five-day visit to the great game preserves of Kenya and Tanzania, followed by a two-week cruise to Aldabra and others of the Seychelles island group from and to Mombasa. Dr. George Watson, chairman of the Department of Vertebrate Zoology at the Smithsonian's Museum of Natural History, will conduct—March 20 to April 15.

"No-Tour" Tour: Includes excursion fare from Dulles International Airport in Washington, D.C., to Paris and return. Members make their own arrangements for travel in Europe—three weeks in June.

South America: A 25-day tour of Venezuela, Colombia, Ecuador, Peru and Brazil, with emphasis on archaeological sites, colonial and contemporary architecture, museums and private collections, including a short visit to the upper Amazon basin from August 2 to August 27.

"No-Tour" Tour: Includes round-trip fare to London, with members making their own arrangements for travel in Europe—three weeks in September.

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In the elegant Pasadena mansion which houses the Caltech Seismological Laboratory, Dr. Charles F. Richter keeps close tabs on seismic activity around the globe.

By Kate Holliday

Charles Richter, 'earthquake man'

After 40 years he is prepared to answer most questions about quakes: why, how and where they happen. But not when

It is somehow very strange that an individual as gentle as Charles Francis Richter should have been intimately involved with natural destruction for more than 40 years. He did not plan it, he fell into it. But the fact remains that he is one of the great authorities on earthquakes. Moreover, his name has entered the language: Any news story about an earthquake inevitably includes in the first few lines a reference to its place on the "Richter scale," a system he developed 36 years ago for measuring and comparing the magnitude of earthquakes.

A small, almost frail man with a brush of white hair, Richter is courtly, even shy, in conversation. His voice is soft. Often his eyes are closed behind his glasses. His talk is simple, almost aimless, until he begins to speak of his own particular field. Then his words take on such unblemished authority that the listener immediately gets the feeling that Richter *knows,* and that all he is doing is nibbling around the edges of that vast knowledge.

Yet there is nothing formidable about Richter's authority. He drops little asides into the talk, grace notes of humor which are entirely unexpected. When speaking of his early work as a seismologist, for example, he comments: "It was 'Fascinating!' as Mr. Spock would say," and you suddenly realize that he is referring to the pointy-eared character in TV's *Star Trek.* It does not quite fit the usual image of Herr Professor.

When you visit his home, set deep in a grove of tall eucalyptus trees, you discover that, next to his wife, his greatest devotion is to a seven-year-old male cat that he found as a stray five years ago. This fattish, thick-haired beast obviously regards Richter as a great patsy and demands endless hours of petting, scratching, brushing and other forms of attention. Richter not only complies, but has filled his bathroom with color shots of the animal and has tucked small ceramics of felines into odd nooks about the house.

A conversation piece

He is the only man I know who has a seismograph in his living room, and who casually drapes its records over the backs of armchairs. He maintains that his wife Lillian, far from protesting the bulky machine, says that it is a definite conversation piece, good for getting parties under way, and that she wouldn't remove it if she could.

His home is, surprisingly, devoid of books. Yet so great is his knowledge of his field that when I last saw him he was completing an article for the *Encyclopaedia Britannica* off the top of his head. But, for all his scientific exactitude, he is not neat; his bedroom looks like a teen-ager's and, as an associate put it, "he works at a cartoonist's idea of a desk." The consensus of his colleagues is that *he* knows where to find a certain paper or record, but that no one else would have a chance.

Now 70, Dr. Richter retired as Professor of Seismology at the California Institute of Technology last July 1. Two years earlier he had stepped aside, with a grace that won the admiration of his co-workers, from the leadership of the seismological reporting network that he had helped to create decades before—a series of stations up and down California that enabled him to report and evaluate earthquakes around the world.

If he is best known to the public for the Richter scale (today seismologists use several other magnitude scales, depending on the type of data available, but his name is popularly—if not quite accurately—applied to all of them), he is equally well known to scientists for his book *Elementary Seismology.* Despite its technicalities, this is a highly readable volume with many amusing anecdotes in the footnotes, and it is used as a text by students in many countries.

Somewhere in the world today there may be a small boy who says, without prodding, "I want to be a seismologist when I grow up." But until recently it hasn't been likely. The majority of today's recognized experts came into the field by accident. They were originally engineers, astronomers, priests (notably Jesuits), even businessmen. And Richter fits that pattern.

Kate Holliday is a free-lance writer whose articles have appeared in many magazines. She lives in Los Angeles and was a war correspondent in Korea.

The earthquake man

He was born on a farm outside Hamilton, Ohio, north of Cincinnati. His parents separated while he was an infant and he saw his father only once in later life. He was raised by his maternal grandfather, a retired manufacturer who in 1909 moved the family to Los Angeles. Quiet, brilliant, curious, Charles went from elementary school to a preparatory school that was then attached to the University of California, won his first degree at Stanford, and entered Caltech to work for a Ph.D. in theoretical physics. Richter's special field was atomic theory, which even in the late 1920s was the coming thing; with Max Born, Werner Heisenberg and Erwin Schrödinger—all eventual Nobel prizewinners—in the vanguard, men and women were excitedly exploring the mysteries of the atom all around the world. Richter fully expected to be one of them for the rest of his life.

In 1927, however, a year before he was to get his degree, the late Dr. Robert Millikan, then head of Caltech, called Richter into his office and said that there was an opening for a physicist in the newly established seismological laboratory and asked if he would consider taking the job.

A way to stay in Pasadena

Richter's reasons for doing so seem astonishingly offhand today.

"It was a way to stay in Pasadena, to remain with Caltech," he says now. "I knew it might not work out at all, that it might be temporary, that I might move if I had another offer." But, like many men before and since, once he discovered the fascination of seismology he was hooked. Having lived in quake-prone Los Angeles since childhood, Richter at least had a background of personal experience to bring to the lab. He soon saw his work there as a challenge to find out what was then not known about these movements of the earth, and to apply this knowledge to ordinary living: to reduce the loss of life from earthquakes by the proper construction of buildings, gas mains, and so on; to pinpoint "zones of risk" throughout the world in an effort to avoid damage and death; and, above all, to devise some sort of system so that the size of any upheaval could be accurately measured by anyone with professional know-how.

These were his guiding principles through the succeeding four decades and remain so today, retired or not. Through original research, lectures and ready accessibility to the press, he has sought to broaden our knowledge of earthquakes and to dispel the endless fallacies about the subject in the public mind. He has taken every opportunity to reiterate such myth-destroying opinions as:

"90 percent of the loss of life stems not from the quake but from buildings which collapse and from fires which start when the quake is over."

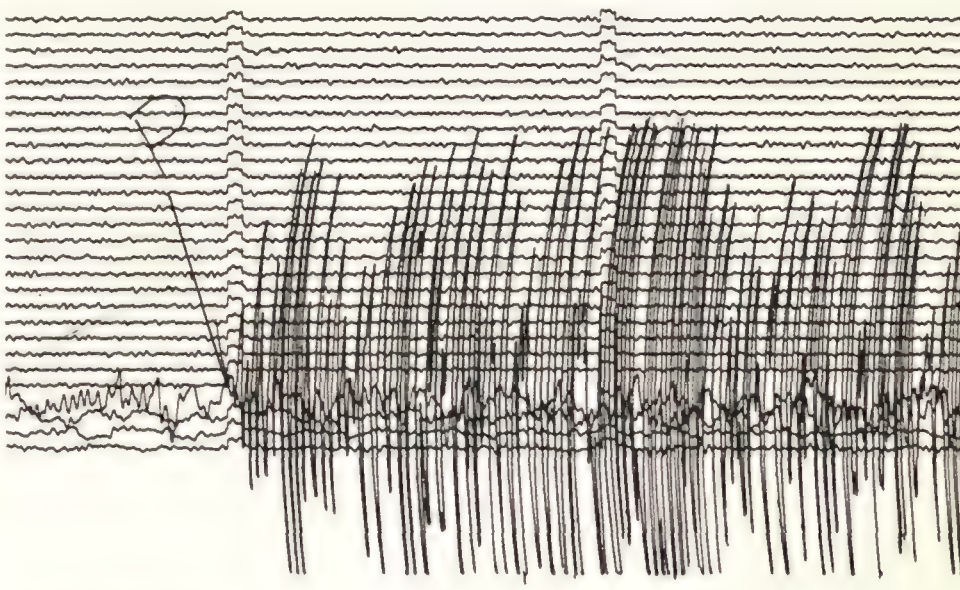
"There is no such thing as 'earthquake weather.' "

"The earth only very rarely opens and closes during a quake, trapping people and animals."

And, above all: "It is not possible to predict an earthquake—and it may never be. Other people are more sanguine about this than I."

These are the words of the mature Charles Richter. The Richter of 1927 knew so little about earthquakes that he couldn't have ventured to pronounce them.

The laboratory in which he found himself as a young man was then, and is now, one of the most extraordinary havens for sophisticated science ever seen by man. This derives in part from the fact that the seismograph is a very finicky instrument. In order to work with maximum accuracy, it must be situated as



A seismogram of the Peruvian earthquake of May 1970, recorded in Rockville, Maryland. One of the most destructive of recent quakes, it had a reading of 7.8 on the Richter scale.

nearly as possible on bedrock, for it records the seismic waves that travel through the earth as a result of a tremor anywhere in the world. Thus, when Caltech got ready to set up its laboratory in the 1920s, its geologists combed the Pasadena area for the perfect spot.

In time they found it: right in the middle of one of the most gilt-edged residential sections of the city. Even in those days the neighborhood was notable for manicured gardens, four-car garages and homes costing as much as $100,000. The idea of a scientific laboratory in this plush enclave caused a near riot, not only among the residents but the city fathers as well. The experts held out, however, and after much discussion it was agreed that the scientists *seemed* very dignified, they would not be setting off explosions or doing anything else to disturb the peace, and they could have their laboratory if it didn't *look* like a laboratory. The architect was therefore instructed to design something that would be a laboratory on the inside but an irreproachable Pasadena-type house on the outside.

The making of a seismologist

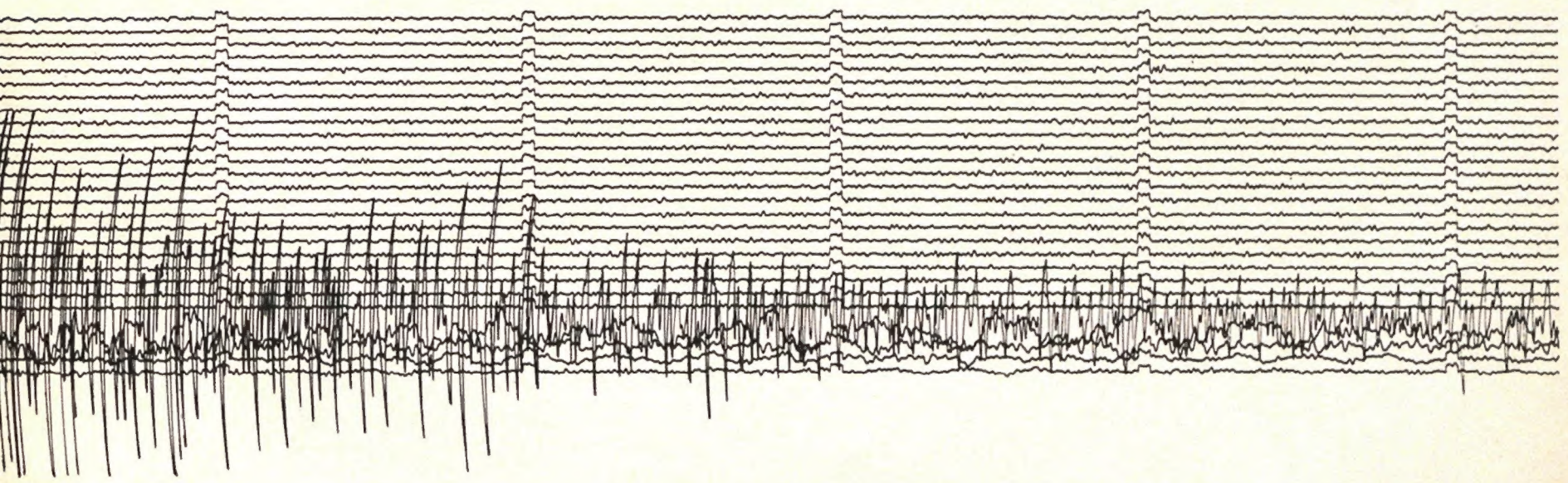
Richter jumped into this new arena with both feet. A few years later, according to witnesses, he was having rousing professional arguments with its director, the late German-born authority, Dr. Beno Gutenberg. It is said that these discussions often became so violent that the combatants ultimately stalked off in opposite directions to cool down, after which apologies as formal as minuets were tendered. Arguments or no, this was the period of Richter's own growing authority, of his learning every scrap of information he could, of reading endlessly, postulating theories, working days, nights, weekends and holidays, and generally having the time of his life.

The day eventually came, however, when the old hybrid building was no longer large enough for the burgeoning staff. New quarters had to be found. Thus, in 1957, the geologists were again on the trail; this time they zeroed in on a mansion so splendid that it would have caused a pang of envy even in Cecil B. De Mille. From cellar to attic it is faintly Spanish, with hand-decorated ceilings, marble floors, wrought-iron balustrades, flagstone courtyards and plumbing apparently done by a man in his cups.

Richter and his colleagues settled into this elegant pad with glee, shucking off, in the process, the last vestiges of professional stuffiness. Today all of them—scientists, technicians, secretaries—come to the office in chinos and desert boots, work complicated equations on blackboards affixed to the walls of former bedrooms, and putter around in a basement full of seismographs. The bathtubs have been covered with cut-to-measure plywood so that records can be stored on them, the dining room is now a library, and the unwary stranger must be led by the hand.

In such a setting, a mind like Richter's—precise yet slightly fey—could expand. To fill in the gaps in his own knowledge, decades ago he began auditing courses in geology at Caltech in his off hours. This went on for years. Today, of course, there is a specialty called "geophysics." Richter evolved his own version as a young man.

And, Richter being Richter, he was not content to read the literature of his new field in translation. In what ultimately became a hobby as well as a collection of working tools, he learned to read not only German, French and Italian, but Spanish, Portuguese and Rus-



sian. When he spent a year at the University of Tokyo in 1959-60 as a Fulbright research scholar, he was able to speak and read some Japanese. And he has picked up enough of the native dialects of Central America to be able to converse with the Indians he encounters on seismological expeditions.

From botany to Star Trek

What interests Charles Richter interests him; what doesn't, doesn't. Thus, he enjoys such diverse sidelines as the Pasadena Arboretum ("He probably knows every plant in the place," one professor said) and *Star Trek,* although he did not watch television of any kind until someone gave him a set; he has no feeling for music; and most sports are alien to him.

The exception is walking. A passionate walker, until recently he went home from the laboratory on foot, a distance of more than four miles up hill and down arroyo. And, each summer, he escapes—alone—to the high Sierras to spend his three-week vacation with a pack on his back, making his solitary way through forests and upland passes.

He says he hates other travel. But let a group go off on a field trip, whether it be to Mexico or, as in February of last year, to New Zealand, and he is first in line at the ticket counter.

And, always, there are the quakes—24 hours a day. Emeritus or not, he is still on call when one occurs—to the press, to the world of science.

The "Richter scale," to put it in its simplest terms, enables a seismologist to evaluate a quake as to its size —or magnitude—at the point of origin. First pinpointing the site by a process similar to triangulation, he can—through instruments as well as charts and formulas—get the same results, no matter where he is, as another man thousands of miles away. He can say with authority: "It had a magnitude of 5.6" or whatever. And the terrain involved—ocean bed, wilderness or built-up city—can give him an indication as to the expected destruction and even death toll.

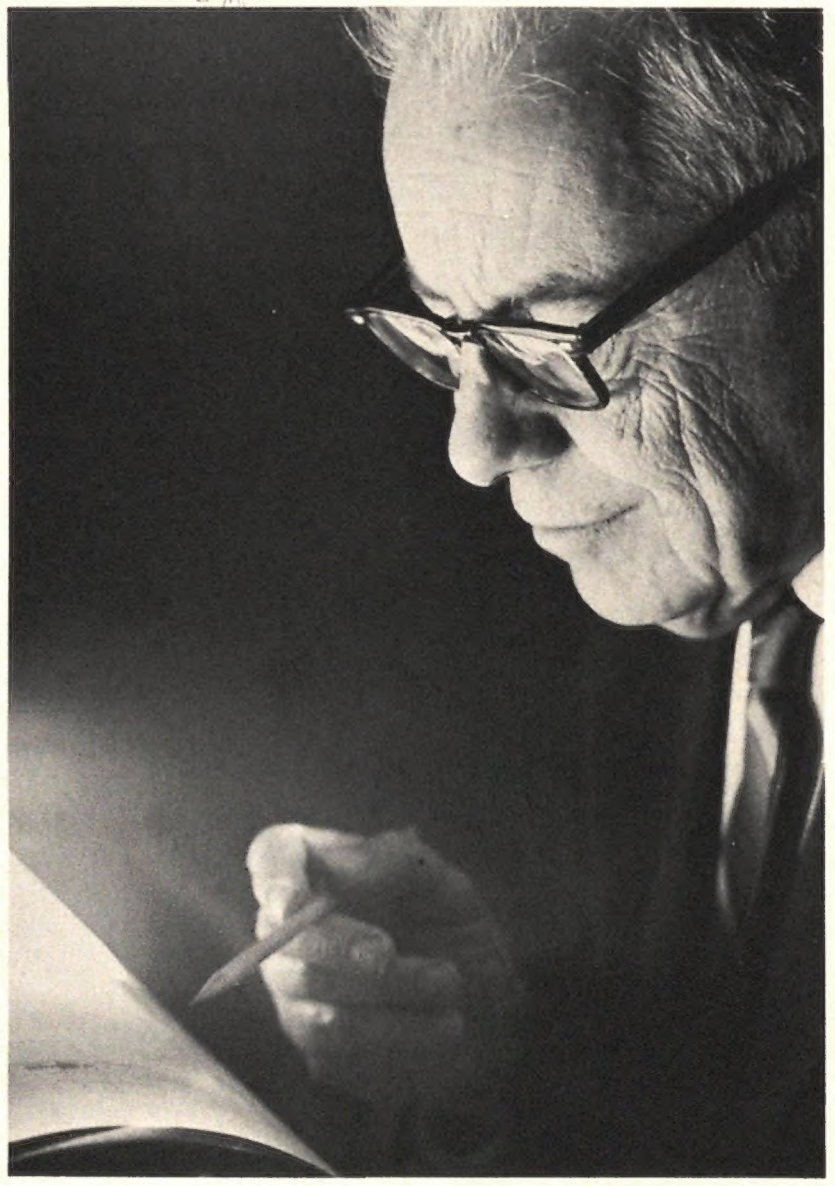
The first jolts of the Borrego Mountain quake in California, on April 9, 1968, were registered at 9 p.m. With a reading on the scale of 6.4, this was a tremor of some magnitude. Within half an hour, thanks to the computer and Richter's system, a team set out in trailers from Pasadena. Just after dawn the men found a crack across a country road that had been caused by earth slippage. Instruments were spotted around the area, and the aftershocks were measured. Both ground-level and aerial photographs were taken, and the entire vicinity was painstakingly mapped. Yet the final report was not finished until two years later.

In the old pre-computer days, even the plotting of the site and determining the magnitude of the original shock took not only time but excruciatingly intense brainwork and paperwork on Richter's part—work so burdensome that early inquiries from the press were often given short shrift. The result was that newsmen used to criticize him for lack of cooperation, not realizing that Richter would *not* say anything until he could give a precise answer. When he could, he was available to all—and delightful. As he said to me recently, when I was having trouble locating him, "You find, you ask, I answer."

One of his admiring colleagues, speaking of Richter's long career, has said: "The seed fell on the right ground at the right time." And it did. For the last few decades have seen vast advances in seismology—new tools, new means of evaluation, new means of communication. And Richter has been in the thick of it. It should come as no surprise that he, in his 60s, was one of the first to master the computer when it was installed, just as he had mastered the complicated data that led to his scale.

It is also in character that Richter, the gentle man of science, when asked if he personally fears earthquakes, replies "Not in general." And then adds, softly: "My impulse is to run. But I know that's not wise. . . ."

Dr. Charles F. Richter in a closeup



By Patrick Ryan

Stills in stomachs for peaceful humans

Way down in Dallas last fall, distressed bird lovers reported woodpeckers flying blind drunk into closed doors and falling paralytic from treetops. In the spring, the local zoo has to keep a spare cage for housing inebriated waxwings while they sleep off their hangovers. The birds get stoned through eating the fruit of such as pyracantha, wild cherry and possumberry after it has fermented in the hot sun. When mixed with two parts avian gastric juice, one part early worm and a dash of dew, the boozeberries provide a cocktail fit to illuminate an ostrich's feathers.

A similar problem of somewhat greater dimension has been met in Africa where the keepers in the Kruger National Park have had trouble with well-oiled elephants which eat hearty of the fruit of the marula tree—*Sclerocarya birrea*—from which the natives make their beer. The elephants then drink all the water they can hold, and let intestinal fermentation commence. Ready-for-action alcohol is thus produced in their belly distilleries and sets them galumphing and staggering like soused husbands.

It might have been better if God had blessed higher primates with the same self-mellowing equipment. If only He had formulated the human race with a safe amount of alcohol as a permanent constituent of its bloodstream, the world would have been spared an awful lot of unproductive *Sturm und Drang*. That stony addiction to principle which afflicts the sober and causes so much warfare would have been replaced by a constant feeling of befuddled fellowship and an international realization that we're all but really dear old pals together. The strenuous efforts of strife would not have overcome preference for gentle sloth.

In later history, unfortunately, the strictly temperate have sometimes displayed violent intemperance. Bacchus never made war on anybody, but Carry Nation negotiated with her hatchet and Adolf Hitler was the 20th century's most notorious teetotaler.

None of this, of course, is designed to cast opprobrium on sober, well-behaved citizens who, for moral or other reasons, do not indulge in *spiritus frumenti*. Still, it is reassuring to the amiable toper that there is sound biblical support for this contention that Man was mistakenly created without enough alcohol in his blood. Perhaps in symbolic redress, the first major miracle that Christ performed was to turn water into wine when the cellar ran dry at the marriage feast at Cana. And the last drink at the Last Supper was the "fruit of the vine" which the apostles were promised they would drink once again in heaven. St. Paul, who was strongly against most forms of human fun, adjured Timothy to "drink no longer water, but use a little wine for thy stomach's sake and thine often infirmities." Solomon in all his wisdom recommends proverbially that we should give "wine unto those that be of heavy hearts."

In the face of all this reverent commendation, our eminent Doctors Michael De Bakey and Christiaan Barnard might take pause to consider whether they are right to concentrate so much of their talents on the repair and transplantation of hearts. It might well be of better service if they started research into an operation to provide the human carcass with a built-in distillery. Perhaps, somewhere among the convolutions of our entrails, a second stomach could be fashioned in which fermentation could take place for beer lovers or distillation for aficionados of the harder stuff. Swallow black grapes to load yourself with burgundy, and white for self-made hock. Euphoria and harmony would then reign and the peace, lovely peace, would be broken only by contented belching of those who add health salts to the hock recipe to come up with a potful of champagne.

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